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**ENGRAVINGS**

OF THE

**MUSCLES AND JOINTS.**



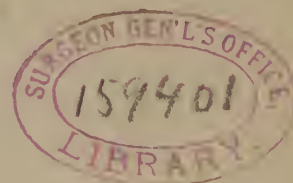
ENGRAVINGS  
OF THE  
**BONES, MUSCLES AND JOINTS.**

BY JOHN BELL, SURGEON.

PART SECOND.

CONTAINING  
ENGRAVINGS OF THE MUSCLES AND OF THE JOINTS.

THE FIRST AMERICAN EDITION FROM THE SECOND LONDON EDITION.

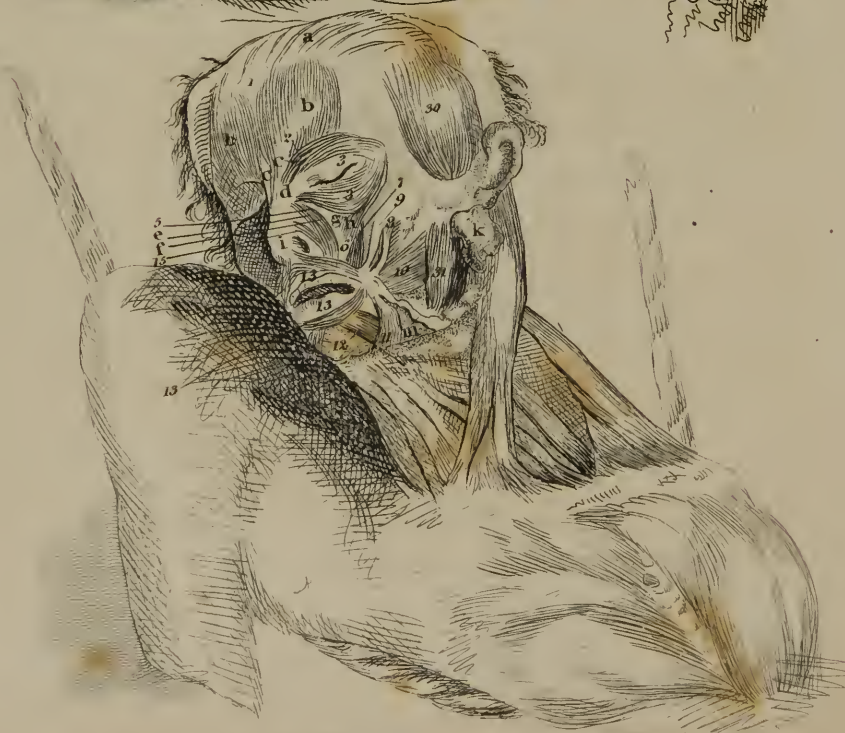


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PHILADELPHIA:  
PUBLISHED BY ANTHONY FINLEY.

William Fry, Printer.

1816.





## BOOK SECOND.

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# OF THE MUSCLES.

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### PLATE I.

### MUSCLES OF THE FACE.

*This Plate explains the Text Book, from page 191, to page 213.*

**THIS** Plate explains the chief Muscles of the Face; and there are seen here several Muscles also of the Neck, Throat, Shoulder, and Breast.—It was drawn from a subject that had been hanged, and the neck being broken, the head lies flatter upon one shoulder, than it should do even in the dead body; for the Atlas and Dentatus, the two first Vertebrae of the Neck, were fairly broken loose from each other.—The muscles are more distinctly seen on the left side; on the right side they are thrown into shadow, and are but faintly indicated.—The muscles of the outline are truer in point of Anatomy; while, in the full engraving, the  
general

general appearance, the thinness and delicacy, and the undefined connections of the muscles, are well expressed; and it is to be particularly noticed, that the Levator Anguli Oris (7.) is not so true in the engraving, while it is, I believe, very true and correct in the outline.

- (1.) Is the OCCIPITO FRONTALIS, which covers the Occiput and forehead, with its two fleshy bellies, and the crown or top of the head with its thin flat tendon. The Occipital Belly is not seen here. The thin Tendon sometimes mistaken for the Pericranium, is marked (*a*); the Frontal Belly is marked (*b*); or rather there are two Frontal Bellies marked (*b b*). Each Frontal Belly sends a small slip of fibres, or a peak, down upon the back of the Nose marked (*c*).<sup>\*</sup> The Frontalis is connected chiefly with the skin, but little with the bone; is chiefly for furling up and wrinkling the skin of the forehead.
- (2.) Is the CORRUGATOR SUPERCILII, more connected with the Orbicularis Oculi, than with the Occipito Frontalis, and lying under the Occipito Frontalis.
- (3.) Is the ORBICULARIS OCULI; arising by a small white Tendon (*d*), from the Nasal Process of the Jaw Bone. Its fibres go in regular circles round the eye, and they are continued circles which return to the white Tendon in the corner of the eye, whence they first arise; the whole muscle is thin, flat, broad, very distinct, shuts the eye-lids, compresses the eye, squeezes out the tears.<sup>†</sup>

<sup>\*</sup> This Nasal Peak of the Occipito Frontalis is not the slip which is fixed into the Os Frontis; that lies deeper, while this Nasal Peak is superficial, runs down the back of the Nose, expanding upon it, and forming with the muscles below a sort of fascia, or Tendinous expansion, which covers the Nose. This Nasal slip is implanted rather into the skin of the Nose, and wrinkles it; while the General Muscle corrugates the skin of the forehead.

<sup>†</sup> The whole of what we call the Orbicularis Oculi, is named by Walther, Corrugator Oculi; and he seems to divide it into an upper and lower portion, by the names of Musculus Semicircularis Palpebræ Superioris, and Musculus Semicircularis Palpebræ Inferioris.

The CORRUGATOR SUPERCILII (2.) arises from the Os Frontis betwixt the Eye-brows, and lies under that Peak of the FRONTALIS which expands upon the back of the Nose.— This Corrugator may almost be considered as merely a slip of the Orbicularis Oculi (3.); for in fact the fibres of the Corrugator go round the orbit with the upper fibres of the Orbicularis Oculi, and mix with them, so as to form the upper edge of the Orbicularis; and thence the names of Corrugator and Orbicularis are sometimes interchanged.\*

(5.) † Is the LEVATOR LABII SUPERIORIS, and ALÆ NASI; This muscle arises by a small double Tendon, from the Nasal Process of the Upper Jaw Bone, and has one little slip (*e*) going into the Ala Nasi for dilating it; and another (*f*) going into the upper lip, for drawing it upwards.‡

(6.) LEVATOR LABII SUPERIORIS PROPRIUS, arises from the Jaw Bone at the very edge of the Orbit, and above the Infra Orbitary Hole§. It has two slips of fibres, one (*g*) coming from the bone, from under the Orbicularis Muscle, and another slip, (*h*) which is continued from the lower fibres of the Orbicularis Muscle itself. So this is a Biceps Muscle; it lies superficially; it draws the middle of the lip upwards; it is often named as a Biceps or two headed Muscle.||

\* Walther, in his description of his own and Sanctörin's Plates, draws into the explanation of this Corrugator Muscle, all the upper part of the Orbicularis Oculi; as if it were but a part of the Corrugator.

† It will be observed here, that the suite of the numbers 1, 2, 3, &c. is not regularly followed, because it was impossible to explain absolutely every muscle in any set of drawings, however full.

‡ “Maxime hunc in usum habent illi, qui detractores contemptoresque sunt aliorum, et “ forte hæc verba in uno vel altero eundem motum excitabunt.”

§ This is the MUSCULUS PYRAMIDALIS of Walther.

|| Eustachius draws the muscle with these two heads. Albinus describes the little head (*h*), as a distinct part of the muscle, both in his explanation of Eustachius, and in his own plates.



(7.) *LEVATOR ANGULI ORIS*; arises above the dog tooth, and is thence named *Caninus*.

This muscle arises under the *Infra Orbital* Hole, as the last arose from above it; this of course lies under the last, and so is less perfectly seen here. Its direction is different from that of the *Levator Labii*; as it runs more perpendicularly, or runs rather outwards than inwards. It is short; two headed like the last; rises properly from the *Socket Process* of the first *Grinder*. It lifts the *Angle* of the mouth, whence its name; and it operates on both lips, whence it is named, *LEVATOR COMMUNIS*.

(8.) *ZYGOMATICUS MAJOR*; arises from the *Zygomatic Process* of the *Cheek Bone*; goes inwards to the corner of the mouth; is long, slender, oblique in its direction. It passes over that hollow in the *Cheek Bone*, which is filled up with fat, and so when the muscle is dissected, it falls into this loose flaccid and bending form\*.

(9.) The *ZYGOMATICUS MINOR*, like it, but not always found.

(10.) The *BUCCINATOR*, is seen here to lie deeper; it forms the flat part of the cheek; it arises from the *Coronoid Process* of the *Lower Jaw*, and from the roots of the back *Grinders*. It goes forward with direct fibres, (as seen here,) towards the corner of the mouth.

(11.) The *TRIANGULARIS*, is neat, small, triangular; its base arises from the *Jaw*, its point ends in the corner of the mouth.—It draws the corner of the mouth down, and is named *Depressor Anguli Oris*, or the *Depressor Communis Labiorum*.

(12.) Is the *DEPRESSOR LABII INFERIORIS PROPRIUS*. This muscle arises from the line of the *Jaw*, touches and crosses its fellow under the middle of the lower lip. They pull the lip downwards.

(13.) The *ORBICULARIS ORIS*, is thick, broad, and fleshy; forms the fleshy part of the lip;

*Cant* observes this separate part proceeding from the fibres of the *Orbicularis*, so particularly, as to reckon it almost a distinct muscle, a depressor of the lower *Eye-lid*; saying “*Ex conspectu illum habere decet pro depressore Musculo Palpebræ Inferioris.*” *Cantii Impetus*.

\* This *Zygomaticus Major*, is sometimes split into two insertions at the angle of the mouth.



lip; is in the red part of the lip, but is much broader than the red part. Its fibres are gross and strong, they go in a circular direction fairly round both lips, they are not interrupted at the angles of the mouth; they send up a small slip, which passing in the furrow of the lip, and mounting upon the Septum of the Nose, is named *Nasalis*, and is marked (*i*).

(15.) The *CONSTRUCTOR NASI*, is here distinctly marked running over the point of the Nose\*.

(30.) Is the *TEMPORAL MUSCLE*; which is seen here, lying under its fascia. The fascia, or Tendinous expansion of the Temple being here entire, and nothing cut away but the Membranous Muscles of the ear, the *ANTERIOR* and the *SUPERIOR AURIS*.

(31.) Is the *MASSETER*, which is a short, thick, and fleshy muscle; and to lay it entirely open, the Parotid Gland which is marked (*k*), is dissected up from the cheek, so that the head of the Masseter is seen arising from the Cheek Bone; and its lower end is seen implanted into the Jaw†.

(*m*) Marks the *FASCIAL ARTERY*, or *LABIAL ARTERY*, as it is called, the Artery of the face, crossing over the angle of the Jaw.

Thus we see in the dead body, those muscles which give form and character to the human countenance, lying all dead and flaccid. The mouth open, the lips loose and shrivelled; the angles of the mouth dropping down, the cheek sunk; and the eye also closed, and sunk down within its orbit.—All the countenance is deformed, and the traits of individual character or beauty, quite gone:—but still enough remains to explain to us what those muscles are, upon which chiefly the interesting variety of expression and form depends. The *Occipito Frontalis* wrinkles the forehead:

\* This is the *Transversus Nasi* of Walther. The action of this muscle is very distinctly seen, in the agony of an Asthmatic fit; it is seen also in violent distortion, produced by rage, or despair. Cant compares it to that muscle in the dog, by which he curls the Nose, and shows the teeth in snarling.

† This is sometimes called, the *MUSCULUS MANSOR*.

forehead: the *Corrugator Supercilii* knits the brows: the *Levatores Labiorum* lift up the lip, spread wide the nostrils, and open the mouth; the *Depressores Labiorum* depress the lip; the *Triangular Muscles* draw down the corners of the mouth; the *Zygomatic Muscle* distorts the cheek, and the *Orbicularis Oris* antagonises all these, and closes the mouth.—These muscles, while they are performing more important offices, also express the passions, and mark the countenance with traits never to be effaced, the true study of those who would be Physiognomists; who talk but idly, when they speak of expression in those immovable features, which are formed rather by the Contour of a bone. “The sagacious forehead or æconomical “nose,” are the rhapsodies of an Enthusiast, not the serious observations of a sedate man, studious of that subject, which is interesting above all others.

The shapes of the bones determine the general form of the face. One great muscle, the *Masseter*, gives the rounding of the cheek; the rest are all delicate and moveable muscles; and the great characters of the face, center round the mouth and nostrils where these muscles converge. The lean and delicate face, gains in expression where the cheek is hollow, the angle of the mouth moveable, the lines strong; but in those who are bloated, the cheek is fuller, the lines obliterated, the delicate turnings of thought and feeling are lost; all but the more violent strains of passion are buried in the mass. The great lines of character, are the line of the *Zygomatic Muscle*, coming from above, and of the *Triangular Muscle* coming from the chin; and the moving point towards which they all act, is the corner of the mouth. In cheerful emotions the features arise all towards the eye, which becomes full and turgid. In the depressing passions the features sink, the eye is languid, and the whole countenance gets a thoughtful serious cast. But still it is the corner of the mouth, that is the central point of all these changes.

The corners of the mouth are continually supported by the action of the *Levator*, and of the *Zygomatic Muscles*; they are raised high in smiling, so as to form a dimple there. They are raised higher in laughter, so as to swell the cheek, wrinkle the  
eye-

eye-lids, and compress the eye, till tears begin to flow. And the corner of the mouth, which is thus raised in laughter, is distorted in pride, malice, hatred; is dilated and drawn backwards in rage; drops lower in grief; and in palsy falls quite down.

These movements round the angle of the mouth, are the chief indications in the face itself, while all other indications of passion, proceed rather from the general system. A healthy body, and chearful mind, have the face full, the eye humid, the limbs braced, the whole body free, and light moving. In languid health, or under affliction and care, the face is pale, the eye cold, the whole body languid and relaxed; and so it is in passion, for the medical arrangement of the passions is nearly correct. There are two great classes of passions, the exciting and the depressing passions; in the exciting passions, as joy or anger, the heart beats high; the face is turgid; the eye prominent and sparkling; the muscles are tense; the limbs braced; the whole body is in a moveable, active, and highly excited state. But when the heart beats languid in grief, or palpitates with fear, the face becomes pale, the features sink, the limbs tremble, the whole frame is unbraced, cold, and unapt for motion; and from these general conditions of the system result all those other marks of passion, which accompany the changes of the face; for in grief, fear, despair, the blood ebbs, and the face is pale, and the features sink; while in anger the face is red, the eye brows corrugated, and the eye turgid and strained; but in rage, the whole muscular frame is strained toward the most violent action, the breath is retained, while the pulse beats high; and so the face becomes turgid, the eye is fiery and red, there is a grinding of the teeth, the angles of the mouth are strained backwards, the nostrils are raised and dilated, the Buccinator, Zygomatic, Masseter, and Temporal Muscles are in violent action, which gives an Angular and Linear hardness to all the features; and saliva and foam proceed from the universal pressure upon all the glands.



## MUSCLES OF THE EYE.

FIGURES XII. AND XIII. of Plate II. Explain the Muscles of the Eye.

The origin of the Muscles at the bottom of the Orbit, being once understood, all their mechanism will be very plain and easy, for this single point has been the chief difficulty from the first. Galen counted the Levator Palpebræ, as one of the proper muscles of the eye; Vesalius understood better than Galen the origin of the Recti Musculus from the bottom of the Orbit, but like Galen he has drawn the eye from Brutes, and has described its muscles, and drawn them in so confused a way, that it is not easy to comprehend that muscle of his, "which adheres in all its course to the Optic Nerve. (Septimus Oculi Musculus, nulla ex parte a visorio nervo liberatus.") But even after this discovery of the true origin of these muscles, one author of very high reputation, Mr. Lieutaud, denied the origin of these muscles around the root of the Optic Nerve; believing that the fixed point, or center of all these muscles, was a point a little to the outer side of that hole, by which the Optic Nerve enters the socket.

But now this point, of their general origin from the bottom of the socket, is universally acknowledged; and the chief dispute is, whether these five muscles, in arising round the root of the Optic Nerve, begin from the periosteum of the socket; or from the bone itself, or from the outer coat (the Dura Mater) of the Optic Nerve; or whether they do not arise by a particular ring, which surrounds the root of the Optic Nerve; for Valsava believed that these muscles began by a sort of ring, which as it surrounded the root of the Optic Nerve, he chose to call *Circulus Moderatarius Nervi Optici*. But in this dispute, as usually happens, both parties are right, and both are in some degree wrong; for two of the five muscles arise more properly from the outer coat of the Optic Nerve, while the three others arise plainly from  
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the Dura Mater where it forms the periosteum of the Orbit; the Dura Mater gradually assuming the nature of a common tendon, from which those three muscles arise.

The place where this tendon begins, is the inner end of that Foramen Lacerum which belongs to the Sphœnoid Bone, and which admits the smaller nerves to enter for the muscles of the eye; for when the Dura Mater has come out by this hole from the Cranium into the Orbit, it assumes, just where it covers that hole, a hard and tendinous nature, becomes white, assumes the appearance of a tendon, and is in fact, the common Tendon by which three of the muscles arise; and as this hole is below the Optic Nerve, and toward the outer side of it, the muscles which arise by this common tendon are chiefly those which pull the eye outwards or downwards; and so this common tendon gives origin to the Abductor, Deprimens and Adductor.

But those muscles again which cover the upper part of the Optic Nerve, arise close round the margin of the Optic hole; they touch the nerve and adhere to it; by adhering to the nerve, they may be said to arise from the nerve or from that Angle of the Dura Mater where it comes through the Optic hole, to go over the Optic Nerve. So the Levator and the Obliquus Superior arise from the Dura Mater, where it forms the sheath of the Optic Nerve; while the Deprimens, Abductor, and Adductor, arise by one common tendon from the Dura Mater where it covers the Foramen Lacerum, forming the periosteum of the orbit.

This is all seen at (*a*), Figures XII. and XIII. where (*a*) shows the fringed edge of the Dura Mater surrounding the root of the Optic Nerve; (*b*) the origin of the Levator and Obliquus Superior, in the angle where the Dura Mater turns backwards. And (*c*) shows the origin of the Abductor and Deprimens coming from the Periosteum of the Foramen Lacerum, a little to one side of the great Nerve.

The only other difficult point, and which is more important still, since it explains the relative size, and shape, and course of these muscles, is the true place of this

central

central point from which the muscles rise, or in other words, the true place of the Optic hole by which the Optic Nerve enters, and from the margins of which all these muscles rise. This will be easily explained by the marginal plate, which shows the holes within the socket; the position of the eye with regard to those holes, and so explains the relative length of each of the muscles.

1st, The eye is placed in the socket, as I have represented by the circle (a), not directly in the middle, but a little to one side. The eye does not look out from the Orbit in the direction of the Axis of the Orbit; for the axes of the two orbits meet almost in the bottom of the socket, crossing in the Cella Turcica,\* but both the eyes look directly forwards. The plane of the fore part of the Orbit being oblique, and falling off towards the temple, while the eye looks directly forwards; the axis of the Orbit, and of the eye can not coincide†. This is the reason of the Pupil, being nearer to one angle and not in the center of the socket, for which we have the best authority, that of measuring the eye when we please. But the authorities of books on this point are these; Heister makes the Pupils distant three inches from each other. Camper makes the Pupils distant two inches and a half. But the eye being compared not with the other eye, but with its own socket, it is found that the center of the Pupil is eight lines from the outer angle of the eye, and seven lines from its inner angle‡. These are my rules for placing the eye in its socket, in this plan. And the eye being thus regularly placed, we find by this drawing, (not geometrically true, but still sufficient for proving and illustrating so plain a matter as this is), that the Foramen Opticum and the larger end of the Foramen Lacerum are much above the center of the orbit, and towards the inner side; whence it is plain that the Optic Nerve in going towards the ball of the eye, moves a little outwards and descends. And it is also

very

\* Camper.

† Winslow, Academie des Sciences.

‡ Petit Academie des Sciences.



very manifest, that since the muscles, to get at their insertions must go round the globe of the eye; those which go round by the outer side of the eye, or pass under it, must be longer, while their antagonists which keep to the inner side of the eye or go over the globe, must be shorter. And so the Adductor Muscle which is on the side next the nose, is the only straight muscle; it is the shortest, while the Abductor is the longest. The Abductor and the Deprimens Oculi, are the longer muscles of the eye: The Adductor and the Levator Oculi, are the shorter muscles.

In this plan, the center of the socket (*a*) is marked by the crossing of its two diameters. The center of the Pupil is marked at (*b*) nearer the inner angle of the eye, the Foramen Opticum is marked (*c*), and the inner end of the Foramen Lacerum is marked (*d*).

In

PLAN FOR THE MUSCLES OF THE EYE.



In FIGURE XII. these points are seen; (*a*) the ring which the Dura Mater forms, where it comes from the brain into the Orbit, accompanying the Optic Nerve; (*b*) the origin of the Obliquus Superior and Levator, from this part of the Dura Mater surrounding the Optic Hole. (*c*) The origins of the Abductor and Deprimens, but the letter (*c*) points more particularly to the origin of the Abductor, which is here seen to be a Biceps, or two-headed muscle, having two Tendons, and the smaller nerves which belong to the muscles of the eye are seen at (*d*), passing betwixt these two tendinous origins of the Abductor. For it is to be remembered, that this Abductor along with two of the Recti, rises from that part of the Dura Mater which covers the Foramen Lacerum; and that the small nerves enter the socket by the Foramen Lacerum.

From this root round the Optic Nerve, the muscles are seen going forwards.

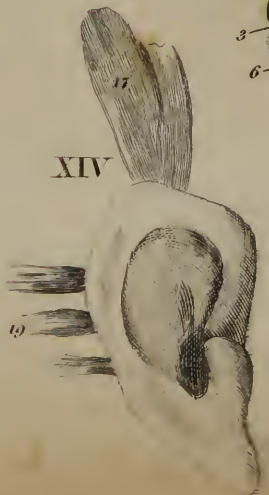
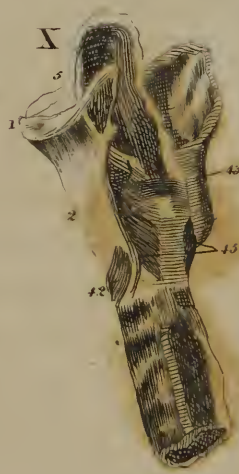
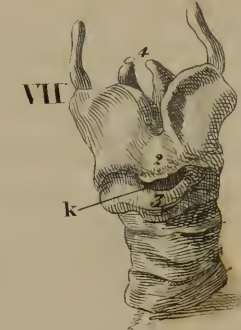
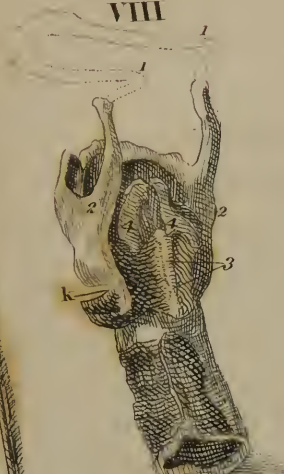
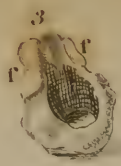
1. The OBLIQUUS SUPERIOR or TROCHLEARIS (29) uppermost, the longest muscle of the eye, with its slender Tendon passing through the Cartilaginous Pulley (*e*), which is left still in its place attached to the Superciliary Ridge of the Frontal Bone (*f*).
2. The OBLIQUUS INFERIOR, (30) is seen, the shortest muscle of the eye, arising from the lower part of the Orbit, and going backwards to antagonize the last.
3. The RECTUS SUPERIOR, (25) next to the Rectus Internus which it hides, is the shortest muscle.
4. RECTUS EXTERNUS (28) or Abducens Oculi, is the longest of all the straight muscles of the eye.
5. The RECTUS INFERIOR or DEPRIMENS OCULI (26) is shorter than the Abducens, (28) but longer than the Rectus Superior (25), because the Optic Nerve enters a little above the center of the Orbit. The tendons of these Recti Muscles are seen expanding flat and broad upon the forepart of the eye; where by shining through that thin and Transparent skin, which covers the forepart of the eye, they form what is called the Albuginia, or white coat of the eye.

There



There remains but one muscle belonging to the eye, and that is, the *LEVATOR PALPEBRÆ SUPERIORIS* (4); which is explained in *FIGURE XIII.* where it is seen rising from the upper part of the *Optic Hole* at (*a*), along with the other muscles; it lies over all the other muscles, and expands into a thin and membranous flesh (*b*), which runs imperceptibly into the substance of the upper eye-lid; and seems to end in (*c*) the *Tarsus*, or *Cartilaginous hoop* of the eye-lid.

The *XIV FIGURE* of this plate, explains the muscles of the outward ear, as they are expressed by *COWPER*. Where (17) marks the *SUPERIOR AURIS* or *Atollens*; and (19) the *POSTERIOR AURIS* or *Retrahens*, as they are explained in the book of the muscles, p. 240.





## PLATE II.

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*This Plate explains the Text Book, from page 212, to page 231.*  
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THIS plate belongs chiefly to the Throat; explains the Cartilaginous and bony parts, of which the upper part of the throat and especially the flute part or Larynx is formed; shows the Os Hyoides; the Thyriod, Cricoid, and Arytenoid Cartilages; the Epiglottis; and the Membranes and Muscles by which these Cartilages are connected, so as to form a rigid tube consisting of parts moveable upon one another, and yet so firm upon the whole, as to be a protection to all the more delicate parts of the throat, and to be the center of all the motions of the Jaws, and Tongue, and Windpipe, and Gullet; or of the Larynx and Pharynx, as they are called.

THIS Plate explains first all the individual parts one by one; and then joins them, showing how the whole is composed; without which regular form of demonstration, nothing could be clearly understood of parts so very intricate and difficult, and having so long a catalogue of hard names connected with them.

FIRST

C

## FIRST ROW.

- The first row gives the parts single and entirely dissected; and there is represented,
- (1.) The Os HYOIDES, which resembles in its general form the lower Jaw Bone of a child, or what is called the Thought Bone of a fowl; (*a*) is its basis, (*b*) its horn, (*c*) the Cartilaginous joinings of the horns and body, and two little Tubercles stand perpendicularly up at the place of this joining, which are called the Cornua Minora or lesser horns, or Appendices of the Os Hyoides. These Cornua Minora are here represented in outline. The Os Hyoides is named also the bone of the Tongue, and its connections are especially to be observed, *viz.* that it lies in the root of the tongue; forms in a manner the top piece of the Trachea, is tied by a membrane to the Thyroid Cartilage, has the Epiglottis (5.) or valve of the wind-pipe planted upon it. And that these connections may be understood, this bone is marked with this figure (1.) in all the other drawings.
  - (2.) Is the THYROID or SHIELD-LIKE CARTILAGE; which is indeed the shield of the Throat, for it is broad, flat, and very deep, and a full inch in length; it is thick, and often ossified. And accordingly it is this broad Cartilage that defends the more delicate parts; its upper horns (*d d*), are tied to the Os Hyoides by a long ligament; its lower ones (*e e*) closely embrace the Cricoid Cartilage. In this drawing, the Cartilage is set so as to rest upon its two lower Cornua, and to support and balance it a common pin marked (\*), was thrust into it.
  - (3.) Is the CRICOID CARTILAGE; which is not, like the Thyroid, a semicircle merely, *i. e.* wanting at the back part, but is an entire ring which forms, as it were, the uppermost and firmest ring of the Trachea, but which still belongs properly to the Larynx. It is shallow before, and very deep in the back part of its circle, plainly for the purpose of raising the Arytenoid Cartilages, (those small Cartilages which

which form the Rima Glottidis or opening of the windpipe); and by this deepness at its back part, the Cricoid Cartilage raises the opening of the Glottis so high, (as is seen figures vii. and viii.) that it is behind the very center of the Thyroid Cartilage where it is well defended and safe. The Articulating Surfaces upon which the Arytenoid Cartilages sit down, are marked (*f*).

- (4.) The ARYTENOID CARTILAGES, are the small and moveable ones, which are of a Triangular form; they are set down upon the upper border of the Cricoid Cartilage, by their base (*g*) with a very moveable articulation; and (*g*) points to the socket surface of the Arytenoid Cartilage by which the articulation is formed. For here the two uppermost drawings of the Cartilage are set opposite to each other, almost in their natural positions, and resting upon their basis, while the lowest drawing of the three, is turned up so as to show its joint. The two sharp points of the Arytenoid Cartilages stand perpendicularly upwards, and give the shape and opening of the Glottis. The tips of the two Arytenoid Cartilages are seen over the Thyroid Cartilage in figure viii. and the Cartilages are seen full in figure vii. settled in their place, and forming the Rima Glottidis or chink of the windpipe, which is narrower or wider as they are moved by their muscles.

- (5.) Shows the Epiglottis, which may be compared to an Artichoke leaf. It flaps down like a small tongue or valve, and, by clapping neatly down upon the Rima Glottidis, makes the food and drink glide clear over the Glottis, and into the Gullet or Pharynx. The Epiglottis is represented in this drawing, so as to explain its connection with the Os Hyoides, and of course with the root of the tongue.



## SECOND ROW.

The connections are explained in the figures of the second row; each part preserves its peculiar marks (1. 2. 3.) &c. and it is seen in figure vi. in what succession these parts stand.

(1.) The



## FIGURE VI.

(1.) The Os Hyoides, connected by its long horns with the upper horns of the Thyroid Cartilage. It is a ligament (*h*) of a full inch in length that connects them. And the common membrane of the Trachea is continued from the Os Hyoides, to the Thyroid Cartilage, so that the gap betwixt them is filled up by a strong, but thin membrane (*i*).

(2.) The Thyroid Cartilage is next, it stands forwards in the throat to defend the other parts; is distinctly felt without; is the most prominent part of the throat; and named *Pomum Adami*.

(3.) Is the Cricoid Cartilage, which in this profile of the throat, is seen to be very shallow before, as it is deep behind.

The Arytenoid Cartilages, (4.) are necessarily hidden in this view; and the Epiglottis (5.) is cut away, to make this drawing more simple and easy.

The Thyroid Gland is marked (6.) the chief part of it is seen on the nearer side of the Trachea, and a part also of the right lobe is seen coming round from the other side behind the Trachea, and almost surrounding it. (7.) Marks the Trachea, and the figure is here made to point to the uppermost ring, that the true place of the Thyroid Gland might be understood, for it lies not upon the Thyroid Cartilage (2.) nor upon the Cricoid Cartilage (3.) as might be supposed, but upon the second ring of the Trachea, leaving the first one free.

## FIGURE VII. AND VIII.

ARE chiefly useful in explaining the places of the two Arytenoid Cartilages, and the way in which they form the opening of the Glottis.

FIGURE VII. The Os Hyoides is cut away. The Thyroid Cartilage (2.) is seen in  
its

its place, defending and concealing the Arytenoid Cartilages; or at least the tips only of the Arytenoid Cartilages are seen (4.) peeping over the border of the Thyroid Cartilage. (3.) The fore-part of the ring-like or Cricoid Cartilage, is seen connected with the upper ring of the Trachea; but leaving an interstice (*k*) of a triangular form, at which point, (and not betwixt the rings of the Trachea), Mr. Vique D'Azir proposes to perform the operation of Bronchotomy.

FIGURE VIII. Shows the back view of the same dissection. The Os Hyoides is shown in outline, and in its true position with its small ligament which connects it with the upper horns of the Thyroid Cartilage; and here it is explained how (1. 1.) the two horns of the Os Hyoides project far beyond the Larynx. They belong more properly to the Pharynx, "and hold the Pharynx extended, as we "hold a bag open with the finger and thumb."

(2. 2.) Show how deep the Thyroid Cartilage is; how fairly it incloses the Cricoid Cartilage, and conceals and defends the Arytenoid Cartilages and the opening which they make; and here it is seen, that the edges of the Thyroid Cartilage belong also to the Pharynx, for the borders of the Thyroid Cartilage do, in fact, form part of the sides of the Pharynx; they assist the horns of the Os Hyoides, in keeping the bag of the Pharynx extended. And the Constrictor Pharyngis, (54. 55. 56.) the great Circular Muscle which embraces the Pharynx, arises chiefly from the tips of the horns of the Os Hyoides, and from this projecting edge of the Thyroid Cartilage.

(3.) Is seen the great deepness of the Cricoid Cartilage behind, and it is seen by (4.) how the Glottis (which is just the opening betwixt the two Arytenoid Cartilages), is raised by this deepness of the Cricoid Cartilage, in its back parts.

The third row of figures exhibits the more important of those delicate muscles by which the Cartilages are moved upon each other; but before these muscles are explained, it is necessary to observe the place and effect of the Epiglottis, which is well seen in figure x. and by the assistance of this figure joined with the demonstration

monstration of figure vi. the succession of parts is very fairly explained.—1. The Os Hyoides.—2. The Thyroid Cartilage.—3. The Cricoid Cartilage follow each other in figure vi.—4. The Arytenoid Cartilages, figure vii. and viii.—5. The Epiglottis, figure x.—6. The Thyroid Gland, figure vi.—7. The rings of the Trachea, betwixt which rings, and below the Thyroid Gland, the operation of Bronchotomy is to be performed.

This x. figure then compleats those connections of the parts of the throat; and the effects of accidental wounds, or of the attempts of Suicides, or of our operation of Bronchotomy will be easily understood. Suicides in their attempts very commonly cut so high in the throat, immediately under the jaw, that they seldom wound the Carotid Artery; nor do they even hurt the more material parts of the throat; for they strike so high, (commonly above the Thyroid Cartilage), that they do not touch the Trachea, nor injure the Glottis. They only cut off the Os Hyoides from the Larynx; they do not so properly cut the throat as the tongue; and when the food passes by the wound, it does not come from a cut of the Oesophagus across the Trachea, but comes merely from the root of the tongue.

These Lateral views explain also how idle it is to talk of performing Bronchotomy above the Thyroid Cartilage, since the Thyroid Cartilage is not in the Trachea, and since the obstruction is below that point, being commonly in the Thyroid Gland, which is here marked (6).—Mr. Vique D'Azir is not more correct in his Anatomy, where he advises Bronchotomy to be performed betwixt the Thyroid and Cricoid Cartilages, in the Triangular Membranous space marked (*k*): for, that is exactly by the side of the Sacculus Laryngis, or Sac of the Larynx, a mucous secreting bag, which lies here on the inside of the Trachea; and the Trocar would lie almost in the opening of the Glottis, or so near it, that the irritation could not be endured. The Larynx cannot bear the operation of Bronchotomy, because it is moveable, furnished with many muscles that are easily excited; and the least irritation near the Glottis, throws them into violent contractions. But the Trachea itself, can easily bear to be transfixed



transfixed with the Trocar, which neither excites contractions, nor gives pain: Besides the obstruction which requires Bronchotomy, is seldom in the tongue or mouth; more commonly in the Larynx; not unfrequently in the Thyroid Gland. So that almost all the occasions that can be supposed, are such as keep us down to the very lowest point of the Trachea, *viz.* That nearest the chest.

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### THIRD ROW.

This row is for demonstrating the chief muscles of the Larynx, and Pharynx; and of course, the motions of these several parts upon each other. And it explains, first, the muscles which lie immediately upon the Cartilages of the Larynx, and which move the parts of the throat upon each other; and these lead to a knowledge of those longer muscles, which come from the jaws, or chin, or sternum, or shoulder; and by which the whole throat is moved. These are represented carefully in the middle figure of this third row, and also in the next plate.

FIGURE IX. Explains chiefly the Hyo-thyroidæi, and Crico-thyroidæi Muscles; for first, The CRICO-THYROIDÆI (42), arise by a small pointed origin, (*l*) from the fore part of the Cricoid Cartilage; go upwards and obliquely outwards about an inch in length; are implanted by a broad insertion (*m*), into the lower border of the Thyroid Cartilage, and where they end, the next muscle begins. For the HYO-THYROIDÆUS (41), is a long, flat, and fleshy muscle, about an inch and a half, or two inches in length; lying flat upon the smooth face of the Thyroid Cartilage; rising from the lower border of the Thyroid Cartilage below, and implanted broad and fleshy above, into the basis of the Os Hyoides a little to one side, and to a part of the horn. Sometimes this muscle is divided into two slips, as it is drawn by Cowper, but more commonly it is single, as represented here, and the upper end of the Sterno-hyoideus (34), is seen here marked with its proper number.

The

The Sterno-thyroideus is implanted into the Thyroid Cartilage, at the point where the Crico-thyroideus (42) ends, and the Hyo-thyroideus (41) begins; so that the Crico-thyroideus is in part covered by the Sterno-thyroideus; and the Hyo-thyroideus again looks like a continuation of the same muscle.

In FIGURE X. are seen chiefly the small muscles by which the Cartilages of the Larynx are moved upon each other, modulating the voice. And the chief of these are, first, the CRICO-ARYTENOIDEUS POSTICUS, and secondly the ARYTENOIDEUS TRANSVERSUS.

The Crico-arytenoideus Posticus (45), " is a small Pyramidal Muscle, which rises " broader from the back part of the Cricoid Cartilage, where the ring is broad " and deep; and going directly upwards, is implanted with a narrow point into the " back of the Arytenoid Cartilage. This pair of muscles pulls the Arytenoid " Cartilages" backwards and outward, so that they at once lengthen and widen the slit; enlarging the opening of the Glottis. Under this lies the Crico-arytenoideus Lateralis, the smallest of these muscles, which arises from the rim of the Cricoid, and is inserted into the root of the Arytenoid Cartilage, and plainly separates the Arytenoid Cartilages, and widens the Glottis.

The ARYTENOIDEUS TRANSVERSUS, (43) is seen here. It is seen crossing betwixt the two Arytenoid Cartilages, going from the root of the one, to the root of the other; its natural office being to contract, or occasionally to close the Glottis.

The ARYTENOIDEUS OBLIQUUS, is a very delicate muscle which lies under this, in the same way that the Arytenoideus Lateralis lies under the Arytenoideus Posticus\*.

The XI. FIGURE explains the Constrictores Pharyngis, and the Styloid Muscles; for (n) represents the Velum Pendulum Palati, cut off from the roof of the mouth, and

\* The young student should carry the throat to his room, wash it in a hand bason, steep and dissect there.—A piece of Anatomy, which with these drawings he will easily manage, which is hardly uncleanly, and cannot but be very important. It is indeed neglected only from being thought impracticable.

and hung out by strings; (*o*) is the UVULA or Pap, in the centre of it; (*p*) is the Anterior Arch of the Palate; (*q*) is the Posterior Arch; (*r*) is the Tonsil lurking betwixt the arches at the side of the root of the tongue; (*s*) is the tongue; (1.) is the Os Hyoides; (2.) is the Thyroid Cartilage; (3.) the Cricoid Cartilage; (6.) the Thyroid Gland; (*t*) the Trachea; (*u*) a piece of wood thrust up through the Oesophagus, and appearing again in the throat at the back part of the tongue; and the great constrictor muscle, is seen going in waves round this piece of wood; or in other words, coursing round the upper part of the Oesophagus, *i. e.* the Pharynx; and (*v*) is the last point of this demonstration, and the most important, for it is the Styloid Process, whence (39.) (53.) and (58.) the three Styloid Muscles arise\*.

The muscles then which are to be seen in this drawing of the throat are, 1. The set of the three Styloid Muscles; 2. the Constrictor Pharyngis; and 3. the Vaginalis Gulæ.

The Styloid Muscles are, the STYLO-GLOSSUS (58.) arising from the forepart of the Styloid Process and going forwards into the substance of the tongue, stretching forwards into its point for drawing it back into the mouth.

The STYLO-HYOIDEUS (39), which begins rather from the backpart of the Styloid Process, and goes here into the side of the Os Hyoides, being slender at its beginning, and broad towards its insertion, as all the Styloid Muscles are.

The STYLO-PHARYNGEUS (53.) lies behind or under the Stylo-hyoideus; for it lies close upon the Gullet or Pharynx, expands upon that part of the bag where it is held extended upon the horns of the Os Hyoides; so that the Stylo-pharyngeus, when it expands upon the Pharynx, touches the horn of the Os Hyoides, which is marked (*x*), and as the middle constrictor of the Pharynx arises especially from  
that

\* The Stylo-glossus I had described in my book of the muscles; but after classing it in the general arrangement, I had forgotten it in the description of individual muscles.



that point of the Os Hyoides, the lower fibres of the Stylo-pharyngeus run alongside of the upper fibres of the middle constrictor, so that they almost mix.

These three Styloid Muscles perform the first movement in the act of swallowing, for they all coincide in lifting up the throat, pressing back the root of the tongue against the palate, (to straiten the Arches of the Fauces;) and confining the morsel. By compressing the morsel, they push it down, and so begin that action, which is completed by that strong Muscle of the Pharynx, which is next seen.

For the CONSTRUCTOR PHARYNGIS, (55.) is a very large and fleshy muscle, which covers five inches (in length) of the Oesophagus, and pushes down the morsel, which is already pressed by the contractions about the top of the Pharynx, and chiefly by the action of the Styloid Muscles. The Constrictor is fairly enough divided into three muscles, (54. 55. and 56.) of which the upper one, which cannot be seen here, rises about the back of the jaws, and from the basis of the skull, and from the root of the tongue.

The MIDDLE CONSTRICTOR, marked (55.) rises from tips of the horns of the Os Hyoides alone, and goes in a diverging form upwards, till it almost touches the skull, and downwards pretty low upon the Gullet.

The LOWER CONSTRICTOR (56.) arises from the borders or wings of the Thyroid Cartilage, and from the ring of the Cricoid Cartilage. This is the thickest and fleshiest of all the Constrictors; it is very large, and goes obliquely upwards, covering the lower part of the middle Constrictor, and a small space is left, a kind of angle betwixt the two Constrictors, which is thin and membranous, and there the tips of the horns belonging to the Thyroid Cartilage, are faintly indicated, as shining through the thin membrane.

The OESOPHAGUS is still farther covered with a sheath of muscular fibres, which run in a perpendicular direction longitudinally along it, till they expand at last upon the stomach itself. This sheath of muscular fibres is called the VAGINALIS GULÆ, and is marked (57.)





Engr. by W. H. 1828



## P L A T E   I I I.

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*This Plate explains the Text Book, from page 217, to page 220.*  
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THIS Plate explains the connection of the muscles of the throat; it explains chiefly the greater muscles coming upwards from the breast and shoulder; or downwards from the Styloid Process, pulling the throat upwards towards the jaws, or downwards towards the Sternum; and these muscles, though they belong chiefly to the throat, do occasionally move the jaws.

IN FIGURE I. which represents the head of an old man, the skin of the neck is dissected off, and cut away, nearly in the line of the Jaw Bone; so as to show, (*a*) the Jaw Bone; (*b*) the Parotid Gland, lying behind the angle of the jaw; (*c*) the Submaxillary Gland, lying under the corner of the jaw; (*d*) the Great Carotid Artery, which carries blood to the head; (*e*) the Great Jugular Vein, by which that blood is returned; (*g*) is the Thyroid Gland, which consists of two lobes, one lying upon the right side of the Trachea, the other upon the left side, the two lobes are joined by a narrow slip of the Glandular substance which lies upon the fore-part of the Trachea, and is called the ISTHMUS, *i. e.* neck betwixt the two lobes, joining together the two lobes of the Gland. The Gland is large, where the bulk of it can lie at either side of the Trachea; but its Isthmus marked (*g*) is very thin, and almost  
 membranous,

membranous, where it lies upon the fore-part of the Trachea. We find the Gland smaller in men, larger in women; of great variety in respect of size; very generally so large, as to be distinguished by the fingers on the outside of the throat; very often enlarged, and often descending deep behind the Trachea, so that the two opposite lobes almost meeting behind, surround that Tube, and explain to us how terrible and how incurable (by any operation at least), that suffocation must be, which proceeds from a swelling of this Gland. This form of the Gland almost surrounding the Trachea, the two opposite lobes nearly meeting behind, is better explained in the Trachea, drawn at Figure vi. Plate ii.

The parts of the Trachea, with which the muscles are more immediately connected; are,

- (1.) The Os Hyoides, which lies in the root of the tongue.
- (2.) The Thyroid Cartilage, where it projects to form the Pomum Adami.
- (3.) The Cricoid Cartilage, which is above the Thyroid Gland. Therefore the Thyroid Gland is hardly entitled to the name of THYROID, since, in place of resting upon the Thyroid cartilage, it lies quite below both the Thyroid and Cricoid Cartilages, upon the first, or rather upon the second ring of the Trachea.

#### THE MUSCLES ARE THESE,

- (137.) Is the STERNO-MASTOIDEUS, the great muscle of the neck; thrown back to expose those smaller muscles which belong properly to the throat; and there is seen,
- (34.) The STERNO-HYOIDEUS, coming up from the Sternum, going upwards to the Os Hyoides, long, flat, ribband-like, and bending where it passes over the Thyroid Gland.
- (35.) The STERNO-THYROIDEUS, coming also upwards from the Sternum; stretching towards the Thyroid Cartilage; lying under the last named muscle; like it flat and ribband-like; covering also the Thyroid Gland, and bulging a little where it passes over the chief bulk of the Gland.
- (36.) The OMO-HYOIDEUS, coming upwards from the shoulder. It is a digastric or two-bellied



two-bellied muscle. The belly (36.) is fixed into the Os Hyoides. The middle tendon (*h*) is seen under the Mastoid muscle; and the lower fleshy belly lies too deep to be seen, for it rises from the Scapula near the Coracoid Process.

These are the chief muscles which pull the throat DOWNWARDS.

The muscles which pull the throat UPWARDS are the MYLO-HYOIDEUS, the BIVENTER, and the STYLO-HYOIDEUS muscles.

(37.) The MYLO-HYOIDEUS arises from the whole length of the Jaw Bone, from the chin to the angle; and it arises not from the lower border of the jaw; but rather from the inner surface of the jaw-bone, almost as high as the sockets for the teeth. It is thick and fleshy; but still it is flat and broad; and goes downwards in a radiated or fan-like form, to be implanted into the basis of the Os Hyoides. Within this muscle lies hidden the Genio Hyoideus; without, lies the fore belly of the Digastric Muscle; the Sub-maxillary Gland (*c*) is an external Gland, and lies under the corner of the jaw without, (*i. e.*) over the Mylo-hyoideus; the Sublingual Gland is an internal Gland which lies under the tongue beneath this muscle. The Mylo-hyoidei muscles of opposite sides are united to each other by a raphe or tendinous seam or line, which is seen at (*i*), and which goes down from the center of the chin to the center of the Os Hyoides.

(40.) The BIVENTER MAXILLÆ INFERIORIS belongs after all more properly to the throat than to the jaw; it is called Biventer from its two bellies, which are indeed very distinct and beautiful; one belly (*k*) arises from the root of the Mastoid Process, and so is seen here coming out from under the Parotid Gland; the fore-belly (*l*) is seen arising from under the chin; the middle tendon has the number of the muscle (40.) put upon it at that point where it passes the side of the Os Hyoides, and there it is attached to the Os Hyoides, not merely by running through a sort of Cartilaginous loop on the side of that bone, but also by running through a loop made by the flesh of the Stylo-Hyoideus muscle, which forks at its insertion.

(39.) Is the STYLO-HYOIDEUS coming from under the Parotid Gland, and implanted in-

to the side of the Os Hyoides, and so binding down the middle tendon of the digastric muscle.

In this drawing then, are seen the chief muscles which affect the general position of the throat, *viz.*

1. The Sterno-Hyoideus (34.), Sterno-Thyroideus (35.), and the Omo-Hyoideus, (36.) pulling the throat downwards.
2. The Mylo-Hyoideus (37.), the Stylo-Hyoideus (39.), and the Digastricus (40.), pulling the throat upwards.

One small muscle remains to be explained; it is the Crico-thyroideus (42.), which arises from (3.) the Cricoid Cartilage to be inserted into (2.) the Thyroid Cartilage.

## FIGURE II.

Is the head of a woman, the neck long, the slender muscles of the throat much dissected and thrown out, very loose and flaccid; and the Thyroid Gland was in this subject particularly large, hung very low down, and made a considerable bending in the two long muscles which run over it. This drawing is a freer dissection of these muscles, where all the Anatomy of the throat is seen; for the Parotid Gland, the Carotid Artery, the Jugular vein, the eighth pair of nerves, and the chief muscles both of the throat, and of the tongue, are here.

The Jaw Bone is here, as in the former figure, marked (*a*); the Parotid Gland (*b*); the Carotid Artery (*d*); the Jugular vein (*e*); and the Thyroid Gland, which appears only at two points, and almost covered by the muscles, is marked (*g*). But the most important parts in the Anatomy of the neck, are the Carotid Artery (*d*); the Jugular vein (*e*); and the Par Vagum, or eighth pair of nerves (8.) This eighth pair is a long nerve, which goes from the head down to the stomach to end there. It is marked (8.); it is seen here, lying upon the great Jugular vein, which

is

is turgid with blood, and bulging out in the form of a dilated intestine: the eighth pair of nerves goes down along with the Carotid Artery and Jugular vein, they being all inclosed in one common sheath of Cellular Substance, which is here dissected away, to show these parts clean.

The Os Hyoides is marked (1.); the Thyroid Cartilage is marked (2.); the Cricoid Cartilage is hidden by the muscles.

In this drawing, the Sterno-mastoideus (137.) is very fully dissected, is made flaccid, and is laid to one side, so as to show the muscles of the throat freely; which for the sake of a clear demonstration, I shall divide into three sets. 1. The muscles from the Sternum, which pull the throat downwards. 2. The Digastric and the Styloid Muscles, which pull the throat upwards. 3. The muscles which make the flesh of the tongue, the chief part of its bulk.

I. The muscles coming upwards from the Sternum and shoulder are,

- (34.) The Sterno-hyoideus, which is seen in all its length, stretching from the Sternum to the Os Hyoides, and bending over the Thyroid Gland.
- (35.) The Sterno-thyroideus; exactly like this, lying behind and under it, proceeding from the Sternum to end in the Thyroid Cartilage, and also bending over the Thyroid Gland.
- (41.) Is the place where the Sterno-thyroideus ends; and the Thyro-hyoideus begins; this (41.) then, is like a continuation of the same muscle, while it is really a distinct one, named THYRO-HYOIDEUS (41.) because it goes from the Thyroid Cartilage, to the Os Hyoides.
- (36.) Is the OMO-HYOIDEUS, of which the fleshy belly is marked, as in the other drawing (36.) while its middle tendon is marked (h.)

2. The



## II. The muscles which pull the throat upwards are,

(40.) The Digastricus, of which the first belly (40.) is seen coming out from under the Thyroid Gland, while the fore belly (*n*) being cut away from the chin, hangs down.

(39.) The Stylo-Hyoideus Muscle, which is seen turning over the tendon of the Digastricus, and tying it down in its place.

(53.) The Stylo-pharyngeus, which lies very deep behind the other Styloid Muscles, passes down under the arm or branch of the Os Hyoides, and expands upon the Pharynx.

*N. B.* In this drawing, the Styloid Muscles are dissected upwards very nearly to that point (under the Parotid Gland,) where they rise small and delicate, from around the roots of the Styloid Process.

## III. The muscles which compose the chief bulk of the tongue, are these,

(58.) The Stylo-glossus, which comes small and delicate from the root of the Styloid Process; expands as it goes towards the tongue, and whose office is to pull the tongue down into the mouth.

(59.) The HYO-GLOSSUS, which I have represented as one single flat muscle, rising from nearly the whole length of the Os Hyoides\*.

(60.) Is the GENIO-GLOSSUS, so named from its rising from that point of the lower jaw bone (*o*), which is called the chin; its fibres go into the tongue in a radiated form, in every direction, capable of performing all kinds of motions, of lolling the tongue out, and also of retracting it again; whence this muscle has by way of pre-eminence been

\* From its arising in three fasciculi or distinct bundles, *viz.* one from the basis, one from the horn, and one from the Cartilage of the Os Hyoides, it has been called the Basio-chondro-cerato-glossus, or each fasciculus has occasionally been described, as a distinct muscle.

been named *Musculus Linguae Polychrestus*. And (*r*) is the tongue itself, composed chiefly of these muscles, and covered with its membrane.

The *Genio-hyoideus* (38.) is a muscle rising from the same point (*o*), of the chin; is implanted into the *Os Hyoideus*. This muscle which rises from the point of the chin only, lies under the *Mylo-hyoideus* (37.) (*vide* Figure i.) which rises from the whole length of the jaw; and these together pull the *Os Hyoides*, and of consequence the throat upwards.

So that there is seen by these two drawings, first, how the *Mylo-hyoideus*, (37.) figure i. and the *Genio-hyoideus*, (38.) figure ii. pull the throat upwards. Secondly, how the *Diagastic Muscle* (40.) and the three *Styloid Muscles*, figure ii. pull the throat upwards and backwards. Thirdly, how the *Sterno-thyroidei*, *Sterno-hyoidei*, and *Omo-hyoidei* pull the throat downwards. And it is lastly very plain, that these at the same time that they are properly muscles of the throat, are occasionally muscles of the lower jaw, the only ones indeed which pull it down; little force is needed for this, the jaw dropping almost by its own weight; but, as the motion must be quick and voluntary, it must be done by muscles; and when the muscles from the *Sternum* fix the throat or pull it down, the *Genio-hyoidei*, *Mylo-hyoidei* and *Biventer* depress the jaw; so that the motions of the jaw and throat, or in other words, the action of chewing and swallowing have this consent, that they are partly performed by the same common muscles, so that we cannot chew and swallow at once; the jaw which moves in chewing the morsel, must be fixed when it is to be swallowed; and so the motions for chewing and swallowing alternatively succeed each other.







## P L A T E III.

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*This Plate explains the Text Book, from page 217, to page 220.*  
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THIS explains the greater muscles, coming upwards from the breast or shoulder, and downwards from the chin and Styloid Process; and by which the whole throat is moved. And these muscles though they belong chiefly to the throat, do occasionally also move the jaws.

In FIGURE I. is seen,

1. The Os Hyoides, where it lies in the root of the tongue.
2. The Thyroid Cartilage, where it projects to form the Pomum Adami.
3. The Cricoid Cartilage, which is above the Thyroid Gland; therefore the Thyroid Gland is hardly entitled to that name; since in place of resting upon the Cartilages of the Larynx, it lies quite below both the Thyroid and Cricoid Cartilages, properly upon the uppermost ring of the Trachea, or upon the first and second ring; then (a) is the Thyroid Gland which consists of two lobes, one lying upon the right side of the Trachea, the other upon the left side; the two lobes are joined by a narrow slip of the Glandular substance which lies upon the forepart of the Trachea, and is called the Isthmus, *i. e.* neck betwixt the two lobes, joining together the two lobes of the Gland. The Gland is large, where the bulk of it can lie at either side of  
the

the Trachea; but its Isthmus marked (*a*) is very thin, and almost membranous, where it lies upon the forepart of the Trachea. We find the Gland smaller in men, larger in women, of great variety in respect of size; very generally so large, as to be distinguished by the fingers on the outside of the throat, very often enlarged, and often descending deep behind the Trachea; so that the two opposite lobes almost meeting behind, surround that Tube, and explain to us how terrible and how incurable (by every operation at least), that suffocation must be, which proceeds from a swelling of this Gland. This form of the Gland almost surrounding the Trachea, the two opposite lobes nearly meeting behind, is better explained in the Trachea, drawn at Figure vi. Plate ii.

THE MUSCLES HERE ARE,

First, the Mylo-hyoideus, (37.) which arises from the whole length of the jaw, *i. e.* from the chin almost to the angle; and it rises not from the lower border of the jaw, but rather from the inner surface of the jaw, almost as high as the sockets for the teeth. It is thick and fleshy, but still is flat and broad; it goes down to the Os Hyoides, is implanted still fleshy, and with radiated or fan-like fibres, into its upper border. The Genio-hyoideus lies within this one; the fore-belly of the Digastricus lies flat upon it without; the Sub-maxillary Gland (*b*), is an external gland and lies (under the corner of the jaw,) above the flat belly of this muscle; but the Sub-lingual Gland lies under the root of the tongue, is an internal Gland, and lies under the belly of the Mylo-hyoideus Muscle. The Mylo-hyoideus of each side is united with its fellow by a tendinous line (*c*), or rapha which goes down from the point of the chin, to the center of the Os Hyoides.

Second, the DIGASTRICUS, (40.) or Biventer, is a muscle having two bellies, one rising from under the Mastoid Process, another arising from the tip of the chin. The fore-belly and the middle tendon only are seen here; the back belly, *viz.* that which rises from

from the root of the Mastoid Process, being hidden by the Sub-maxillary Gland (*d*). The fore-belly of the Digastricus rising from the chin, is marked (*e*); the middle tendon is marked (*f*). At this place it runs through a loop of ligament, and so is attached to the side of the Os Hyoides.

Thirdly, the STERNO-HYOIDEUS (34.) is seen here coming from the Sternum, going to the Os Hyoides; passing flat and ribband-like over the Thyroid Gland, and bulging a little where the chief bulk of the gland lies below.

Fourthly, the STERNO-THYROIDEUS (35.) rises like it a little deeper and behind it; is like it a flat and ribband-like muscle; like it covers the Thyroid Gland, and bulges a little over the place where the chief bulk of the Gland is. And where this Sternothyroideus ends, the HYO-THYROIDEUS (41.) begins, and is like a continuation of that muscle.

Fifthly, the OMO-HYOIDEUS (36.) once named Coraco-hyoideus, comes upwards from the shoulder, from near the Coracoid Process. It crosses the neck obliquely, and is inserted along with the other muscles, into the side of the Os Hyoides.

And lastly, the STERNO-MASTOIDEUS (137.) the great muscle of the neck which runs obliquely across, forming the Contour of the neck, and the chief muscle which appears outwardly, is seen here lying flaccid and ragged, still connected with the skin and flesh; and dissected clean, at its lower part only, where it rises by (*g*) a small round tendon from the Sternum, and by (*h*) a broad fleshy origin from the clavicle, of which (*i*) indicates the broken end. The whole muscle, passing obliquely across the neck is implanted under the ear into the Mastoid Process, and from its origins and insertions, it is named the STERNO-CLEIDO-MASTOIDEUS Muscle.

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## THE SECOND HEAD,

Is the drawing of a freer dissection of all these muscles; where all the Anatomy of the throat is seen, for the Parotid Gland, the Carotid Artery, the Jugular vein, the eighth



eight pair of nerves, and the chief muscles both of the throat, and of the tongue are here.

The Face is laid open, so that some of its thin cutaneous muscles are seen; as the Orbicularis Oculi, (3.) slightly indicated; the thick mass of the Masseter (31.) is seen; the Temporal Muscle (30.) is seen, not dissected, but lying under the thick Fascia of the temple, and (a) the great Parotid Gland, is seen lying before the ear, the lower corner of the Gland being dissected up from the deep hollow under the angle of the jaw, in order to shew the place of the Styloid Process, and the muscles rising from it. (b) Marks the great internal Jugular vein. (c) Marks the Carotid Artery. (d) Marks the Par Vagum, or eighth pair of Nerves, which comes out along with the Jugular vein, and runs down the neck betwixt the Jugular vein and the Carotid Artery, inclosed along with them in a sheath formed out of the common cellular substance; and (e) marks the Thyroid Artery, which is the first branch of the Carotid Artery, and takes this sharp turn backwards, to go down to the Thyroid Gland.

#### THE MUSCLES ARE,

1. The STERNO-MASTOIDEUS, (137.) which is lying flaccid, being dissected and laid aside to uncover the Artery and the vein which lie under it.
2. The DIGASTRIC MUSCLE, (40.) of which the upper belly is seen drawn out from its true direction by a thread, and it is thus displaced a little in order to show the Styloid Muscles; and that belly (g) which comes from the chin, and which is seen in its place in the first figure, is here seen cut up and turned backwards, and hanging by that point at which the middle tendon is attached to the side of the Os Hyoides.
3. The STYLOID MUSCLES lie in a group, round the root of the Styloid process; the Styloid Process itself is marked (m); and the STYLO-GLOSSUS (58.) is seen going towards the tongue. The STYLO-PHARYNGEUS (53.) is seen going down towards the Pharynx,

Pharynx, covered by the *STYLO-HYOIDEUS*, (39.) which is fixed into the side of the *Os Hyoides*; and which forking into two, where it touches that bone, embraces the middle tendon of the *Digastricus*, so as to let it run as a rope in a pulley.

4. The set of muscles composing the tongue, and making up its chief bulk and substance, are also explained here. The *GENIO-HYOIDEUS* (38.) is seen lying in the root of the tongue, coming from the point on the inner surface of the chin, and inserted into the *Os Hyoides*. The *GENIO-GLOSSUS*, (60.) is next seen, going from the same point into the substance of the tongue, with fibres radiated in every direction; some fibres going backwards, some upwards, and some again forwards, it is capable of performing all the various motions of the tongue, hence it has been called *Musculus Polychrestus*. Then the *HYO-GLOSSUS*, (59.) which rises from the *Os Hyoides*, I have represented as one single muscle, and have given it here the most simple name. It is drawn as rising from the whole length of the *Os Hyoides*\*.
5. The set of muscles coming upwards from the Sternum or shoulder, are also well explained here; for the *STERNO-HYOIDEUS*, (34.) is seen running up along the forepart of the Trachea, bulging out a little where it passes over the Thyroid Gland, which in this woman was very large; and bending the more because the muscle (which is full six inches long), is here fully dissected, and so lies quite flaccid and loose. The *STERNO-THYROIDEUS*, (35.) is seen very distinctly, also covering the Thyroid Gland lying behind, and under the last named muscle.
- N. B. The *HYO-THYROIDEUS*, (41.) is seen continuous with this one, beginning where it ends like a continuation of the same muscle. Lastly, The *OMO-HYOIDEUS*, (36.) is seen coming obliquely upwards from the shoulder, and here it is very distinctly seen that at (*n*), the place where this muscle runs under the belly of the great Sterno-

\* From its arising in three fasciculi or distinct bundles, *viz.* one from the basis, one from the horn, and one from the Cartilage of the *Os Hyoides*, it has been called the *Basio-chondro-cerato-glossus*, or each fasciculus has occasionally been described as a distinct muscle.

Sterno-Mastoideus Muscle, it is not fleshy, but small, delicate and tendinous. Then this muscle has a middle tendon which though very short, (being but an inch in length), is yet very distinct and very constant; so that the Omo-hyoideus is properly a Digastric Muscle, as fairly as the Digastricus Maxillæ Inferioris. It has one belly from the shoulder, near the root of the Coracoid Process; one at the throat, from the Os Hyoides; and the middle tendon (*n*), runs under the belly of the STERNO-MASTOIDEUS.

So that there is seen by these two drawings, first, how the Mylo-hyoideus, figure i. and the Genio-hyoideus, figure ii. pull the throat upwards. Secondly, how the Digastric Muscle, and the three Styloid Muscles, figure ii. pull the throat upwards and backwards. Thirdly, how the Sterno-thyroidei, Sterno-hyoidei, and Omo-hyoidei pull the throat downwards. And it is lastly very plain, that these at the same time that they are properly muscles of the throat, are occasionally muscles of the lower jaw, the only ones indeed which pull it down; little force is needed for this, the jaw dropping almost by its own weight; but, as this motion must be quick and voluntary, it must be done by muscles, and when the muscles from the Sternum fix the throat or pull it down, the Genio-hyoidei, Mylo-hyoidei and Biventer depress the jaw; so that the motions of the jaw and throat, or in other words, the action of chewing and swallowing have this consent, that they are partly performed by the same common muscles, so that we cannot chew and swallow at once; the jaw which moves in chewing the morsel, must be fixed when it is to be swallowed; and so the motions for chewing and swallowing alternatively succeed each other.









## P L A T E IV.

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*This and the two following Plates explain the Text Book, from Page 232, to Page 285.*  
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THIS plate explains those broad muscles, which, belonging to the Scapula, lie flat upon the back, covering the whole of the trunk, and which are very remarkable in beautiful statues. The muscles are chiefly the **TRAPEZIUS**, and the **LATISSIMUS DORSI**; and this drawing is not so much of value as a piece of Anatomy, as in explaining to the student the first appearance of his dissection of the back; and by explaining the great muscles of the Scapula, it marks a good beginning for the Anatomy of the arm.

The **TRAPEZIUS MUSCLE**, (62) “is one of the most beautiful muscles of the body, of  
 “a Lozenge-like form. Covers all the back and neck quite round to the fore-part of  
 “the shoulder; the two muscles extend from the tip of the one shoulder, to the  
 “tip of the other, and from the nape of the neck quite down to the loins.” The  
 strong middle tendon by which the two muscles of the opposite sides are connected,  
 is marked (*a*), the insertion into the Occiput is marked (*b*), and the insertion  
 into the spine of the Scapula, is marked (*c*).

“The **LATISSIMUS DORSI**, (70.) it is the broadest not only of the back, but of the  
 “whole body, covering all the lower parts of the back and loins.” Its broad, flat,  
 and



and glistening tendon is marked (*d*), the chief belly of the muscle is marked with its number (70.); the place where its fibres cross is marked (*e*), and it then runs under the arm into the deep shadow, being implanted into the arm bone to pull the arm backwards.

The **DELTOIDES** (71.) next appears, the skin being thrown down carelessly, so as to show where this muscle rises from the Spine of the Scapula; and especially its origin is seen; for it rises from the Spine of the Scapula (*c*), and in part from that line of the Scapula into which the Trapezius Muscle is inserted.

A small part of the **TERES MAJOR**, (76.) is seen in the space betwixt the Deltoides, and the **Latissimus Dorsi**; a small part of the **INFRA-SPINATUS**, (74.) is seen lying upon the Scapula, under this (the back) part of the Deltoid; and also a small part of the **Rhomboides**, (65.) is seen under the edge of the Trapezius Muscle. Upon the haunch, the upper part of the great **Gluteus Muscle** (163). is seen uncovered of the skin, which hangs like a scroll over the edge of the table.







## P L A T E V.

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*This Plate with the IV. & VI. explains the Text Book, from Page 232 to Page 285.*  
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THIS plate shows the arm in that posture into which it naturally falls, when thrown out upon the table, *viz.* standing upon the lower angle of the Scapula, the shoulder joint raised, and a little supported, the elbow touching the table, the fore-arm lying flat along the table, the wrist raised by the box of knives thrust under it, and the hand dropping over the box, so as to touch the table again, with the knuckles.

FIGURE I. describes the outermost layer of Muscles. Figure II. (a fuller dissection,) explains those which lie under, and contains every muscle quite down to the bone. The two drawings are explained as one, since they are indeed two drawings of the same arm in one posture; and the most natural arrangement for this explanation is, 1. Of the muscles lying on the Scapula, and moving the shoulder bone. 2. Muscles lying on the arm, and moving the Radius and Ulna, the two bones of the fore-arm, and 3. The muscles which lie upon the fore-arm, and which move the wrist, and fingers, and thumb.

## I. MUSCLES

## I. MUSCLES LYING UPON THE SCAPULA.

There is seen here, the part of the *SERRATUS MAJOR ANTICUS* Muscle, (66.) which lies upon the fore-part of the chest, which goes backwards under the Scapula, betwixt it and the ribs; and which is implanted, as is seen here, into all the line of the Basis of the Scapula, to pull it forwards. The place where the *SUPRA-SPINATUS* (73.) lies, above the Spine, is seen filled with its muscle in the upper drawing, and the place of that muscle is seen empty, and with only naked bone in the lower drawing.

The *INFRA-SPINATUS*, (74.) is seen both in the upper and in the lower drawing, covering all that part of the Scapula, which is below the Spine.

The *TERES MINOR*, (75.) is seen both in the upper and in the lower drawing, lying in its place not much dissected, and so little separated from the *Infra-spinatus* (74.) that it looks rather like a particular fasciculus of that muscle, as indeed it is; but though the *Teres Minor* is not in its fleshy belly easily distinguished from the *Subscapularis*, yet it has its tendon very distinct.

The *TERES MAJOR* (76.) is neither like the *Teres Minor*, nor is it round as its name imports, but is a large, flat, and long muscle which comes along with the *Teres Minor*, from the angle of the Scapula, and being here fully dissected, and hanging flabby, it is seen, that it-twists under the shoulder bone, and is implanted, not like the *Teres Minor*, which goes into the knob on the outside of the head of the shoulder bone; but low down, and upon the shaft of the bone, almost as low as the insertion of the *Deltoid Muscle*; so that the shoulder bone is embraced betwixt the two *Teretes Muscles*, even in the natural condition of the parts; and in the awkward twistings of a luxation, the head of the bone is often closely embraced and strangled, as it were, betwixt the two *Teretes muscles*, and not unfrequently under the *subscapularis*; an accident which makes the bone more difficult to reduce; but very often  
the

the joint is not at all embraced by the muscles, but is quite loose and moveable, and its being easily reduced, is rather perhaps to be considered as a sign of the joint being much hurt and all these muscles torn away.

(71.) Is the *DELTOIDES*, the last muscle which proceeds from the Scapula on this side of the arm. It is seen here rising from the Spine of the Scapula (*a*), from the tip of the Acromion Process (*b*), and also it has an origin from a part of the clavicle. It is seen here implanted in the arm bone at (*d*), about one third down. In the upper drawing it lies in its place; in the lower drawing it is cut up and turned backward, to show the head of the bone, and the insertion of the *Teres Minor*.

But there are still two other muscles which rise from the Scapula, to be implanted into the arm bone, *viz.* the *SUBSCAPULARIS*, (77.) and the *Coraco-brachialis*, (72.) which are both seen in the next plate.

II. The Muscles moving the fore-arm, and which lie upon the arm, are the *Triceps* and *Anconeus* behind, and the *Biceps* and *Brachialis Internus* before.

The *Triceps* (80.) was once described as three muscles, but is now accounted as one muscle, having three heads; (*e*) the first, a long head, which rises from the lower edge of the Scapula, near the Glenoid Cavity; and, coming down betwixt the *Teres Major*, and the *Teres Minor* Muscles (75.) and (76.) meets the second head which is shorter; for the second head of the *Triceps* (*f*), rises from the shoulder bone, a little below the head of the bone, and takes a long origin from almost the whole length of the humerus. In these two drawings, the first and second head only of the *Triceps* is seen; but in the next plate, the third or shortest head (*g*) of the *Triceps* is seen, coming rather from the inner side of the bone, and lower down. The *ANCONÆUS*, (81.) or Muscle of the Elbow, is a small muscle not very easily found nor understood. It lies exactly upon that part of the elbow on which we rest in leaning upon the arm. It is seen in the upper drawing only, and is marked with its number (81.)

(78.) The



(78.) The **BICEPS**, the Thick Muscle of the fore part of the Arm, is seen in the upper figure. But the middle of its belly only is seen; its heads lying under the Deltoid Muscle. The **BRACHIALIS INTERNUS**, (79.) which lies under the Biceps, is seen in the upper drawing, but it is better seen in the lower drawing; and the manner of its rising from the fore part of the shoulder-bone is tolerably well expressed. Neither of the heads of the Biceps can be seen in the upper drawing, because of the Deltoid Muscle; but in the lower drawing, where the Deltoid is cut up from the Scapula, and reclined backwards, the longer head of the Biceps is seen raised upon the blow-pipe, (*h*) which is passed under it just where the tendon is coming out from the Capsule of the shoulder joint; for this head of the Biceps is a long and slender tendon, which comes from within the cavity of the shoulder joint, and goes down under the belly of the Deltoid Muscle, being tendinous quite to the middle of the arm.

The muscles of the **FORE ARM** are arranged in my description of the Muscles under two classes.

I. The Extensors of the wrist, fingers, and thumb, which all keep the outer round side of the fore-arm, arising chiefly from the outer Condyle.

II. The Flexors, or Benders of the wrist, fingers, and thumb, which lie all upon the inner flat side of the fore-arm, rising in their turn, chiefly from the inner Condyle. In these drawings the extensors only can be seen; in the drawings of the next plate all the flexors are seen.

To begin then with the Muscles lying upon the upper or radial edge of the fore arm, there is,

(92.) The **SUPINATOR LONGUS RADII**, which turns the palm of the hand up; for it rises from the shoulder bone, above the elbow joint, and goes down the fore-arm with a long flat tendon, which is marked (*i*) to be planted into the Radius at its fore-part.

(102.) The **SUPINATOR RADII BREVIS**, is a deeper Muscle, and therefore it is seen  
only

only in figure ii. where it is seen lying close upon the Inter-osseous Ligament, rising from the Ulna, going across to be inserted broad and fleshy into the Radius, and turning the Radius upon the Ulna, so as to throw the palm upwards.

The two next muscles keep also very exactly to the Radial edge of the arm; belong to the wrist; are the extensors of the wrist on the Radial side of the arm; and are named *Extensores Carpi Longior et Brevior*.

(93.) The *EXTENSOR CARPI RADIALIS LONGIOR*, rises from the arm bone just under the place of the *Supinator Longus* (92.); has a strong fleshy belly like it; and its long tendon accompanies the long tendon of the *SUPINATOR*, and is implanted near the root of the thumb, at (*k*), to bend the wrist back.

(94.) The *EXTENSOR CARPI RADIALIS BREVIOR*, rises also from the shoulder bone, but lower, and thence it is shorter; but it is in all other respects like the former; like it has a short thick fleshy belly; a long and slender tendon, running along the wrist, is implanted into the back of the hand, at the root of the fore-finger, at (*l*); and like the former it bends the wrist backwards.

These three muscles, the *SUPINATOR*, and the two extensors, form the chief flesh of the fore-arm just under the elbow joint, and the three bellies make three dimples and three curious swellings, which are drawn by the painter with great care, for they make the chief marks of the fore-arm; and the true drawing of the fore-arm (in its bendings and fore-shortenings, and especially in its strong exertions of pulling or grasping,) consists chiefly in the right placing of these three bellies, where they cover the joint; and it is the rising belly of the *Supinator*, which (in the drawing), joins the fore-arm rightly to the arm. These three muscles are seen lying in their places in the upper drawing, but flaccid. In the lower drawing, the *SUPINATOR*, (92.) is cut away, and the place, whence it was cut out from the arm-bone, is marked with its number (92.), while the long Extensor (93.) and the short Extensor (94.) are both left in their place; but they are much dissected, and allowed to hang

over

over by their own weight to the inner side of the fore-arm, so that in this lower drawing their tendons are less perfectly seen.

- (95.) The *EXTENSOR CARPI ULNARIS* is seen in the upper drawing dissected very clean, lying loose and flabby, but yet not separated from the *Ulna*; whereas in the lower drawing it is so fully dissected, as to fall away from the *Ulna*, leaving the bone at (*m*) naked.

And so there remains of all the muscles on this side of the fore-arm, those only which extend the fingers and thumb; and they are all seen, in the upper drawing, dissected, but still in their places. In the lower arm they are all thrown loose.

- (96.) The *EXTENSOR COMMUNIS DIGITORUM* is seen in the upper drawing thick and massy; covering the other slender muscles. This muscle goes to all the fingers, by the tendons (*nn*) which are seen on the back of the hand. In the upper figure the *Extensor Communis* is in its place; in the lower drawing it is cut up, and thrown out upon the table.

- (97.) *EXTENSOR DIGITI MINIMI* vel *Auricularis* is seen only in the lower drawing, for in the upper drawing it is covered by the *Extensor Communis*. It is like a slip of the *Extensor Communis*, and consequently it is cut up here along with the *Extensor Communis*.

The slender tendons of the *Extensor Communis* are marked (*nn*). The slender tendon of the *Auricularis* is marked (*o*). But the fore finger also has a particular *Extensor*, which is named *Indicator*, and the thumb has three *Extensors*, named *1st*, *2d*, and *3d*.

- (98.) The *EXTENSOR PRIMUS POLLICIS* is the first upon the edge of the arm, passing obliquely over the *Radius* (99.) The *EXTENSOR SECUNDUS* is next to that; and the *EXTENSOR TERTIUS* (100.) is next to that again. These three *Extensors* are seen fully dissected in the lower drawing, hanging loose, and their slender tendons distinctly seen. In the upper drawing they are less dissected; and the manner in which the three tendons cross obliquely over the wrist, and the manner of their coming up to the thumb touching the great joint of it, is well explained. It is seen here that these tendons are

bound



bound down by the Annular Ligament (\*); and by raising the thumb strongly in our own hand, we can compare it with this dissection, for we see the starting up of these tendons of the thumb, and we see at the same time the point distinctly marked at which the ring of the Annular Ligament holds them down.

The INDICATOR (101.) lies next to the Extensor Tertius Pollicis; it rises from the Ulna; its slender tendon goes up to the fore-finger to extend it. This muscle is seen only in the lower drawing. In the upper drawing all the muscles are in their natural places, the tendons being bound down by the Annular Ligament which is marked (\*). It is a tendinous expansion, thin, flat, and ribband-like, and the muscles extending the fingers are seen through this transparent band. It is called the Annular, or ring-like Ligament of the wrist.



## P L A T E VI.

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*This Plate explains the Text Book, from page 217, to page 220.*  
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THIS Plate explains all the flexor muscles of the hand, wrist, and fingers, by a drawing taken when the arm was set up for the figures of the last plate, and consequently the postures are expressly the same; and the parts, as the SCAPULA, the CLAVICLE, and the position of the fore-arm, must be easily understood.

THE Seratus Major Anticus (66.) is still seen hanging down from the basis of the Scapula. Part of the Supra-spinatus (73.) is seen above the Spine.

The SUBSCAPULARIS (77.) is seen filling the whole of the hollow of the Scapula, lying under the Scapula, betwixt it and the ribs.

The TERES MAJOR (76.) is seen here also hanging down flaccid from the place, where it is implanted into the shoulder bone.

That part of the DELTOIDES (71.) which arises from the Clavicle (*a*) is seen here.

The BICEPS BRACHII (78.) is seen in the upper drawing with the belly marked (78.), lying in its place. Its longer slender tendon which comes from within the shoulder joint is marked (*b*). Its shorter tendon which still is very long but thick and fleshy,

is



is seen marked (*c*), coming from under the Deltoid muscle where it rises from the Coracoid Process. Its flat tendon, which expands upon the fore-arm, and strengthens the general fascia of the arm, is seen spreading out over the muscles at (*d*), and the ragged edges of the fascia are seen lying out upon the muscles, for the muscles both above and below are dissected clean, while the fascia of the arm is left only at (*d*), that the connection betwixt this fascia and the Biceps tendon might be explained.

In the lower drawing the shorter head of the Biceps (*c*) is seen cut away from the Coracoid process (*e*), and hung up by a string. The longer head (*b*) is pulled upwards by a string, that it may be seen how it comes from under the clavicle, where it rises within the shoulder joint. The Coracoid Process whence the shorter head arises is marked (*e*), and it is seen that there are three points of muscles sticking to the apex of the process; for the little pectoral muscle (67.) is implanted into it; and the CORACO-BRACHIALIS (72.) and this shorter head of the Biceps rise from it.

The BRACHIALIS INTERNUS (79.) is seen in both arms, lying under the belly of the Biceps, and rising from the bone.

The CORACO-BRACHIALIS (72.) is seen in both the drawings. In the upper drawing it is touched by the short head of the Biceps, which makes it less distinct. In the lower drawing the short head of the Biceps is tucked up. The Coraco-brachialis is fully dissected, and is left flaccid and hanging away from the arm bone; and its origin from the Coracoid Process (*e*) and its insertion into the middle of the shoulder bone at (*g*) are both well seen.

Over the middle of the bending of the Coraco-brachialis there is seen the remains of a flat and broad tendon, (69.) sticking to the arm bone, which is the cut tendon of the great pectoral muscle, which is implanted thus low upon the Os Humeri, to give it the advantage of a lever in pulling the shoulder bone inwards. I have used the mark (69.) of the pectoral muscle to point out its tendon.

The TRICEPS (80.) is also well seen, especially two of its heads, viz. the longest head (*f*), and the shortest head (*g*), while the head which is of a middle length lies upon the back part of the bone, and cannot be seen in this view.

The

The muscles of the FORE-ARM, *i. e.* all the Flexors of the hand, fingers, and thumb, are shown here; in the upper drawing, they are in their natural position, in the lower drawing, they are separated for demonstration, and some of them are hung out.

In the upper drawing, the muscles of the fore-arm are few and simple, lying regularly in their places; and so are easily understood.

One muscle belonging to the outside of the arm is seen here, *viz.* the SUPINATOR RADII LONGUS, (92.) the belly of which is seen lying upon the Radial edge of the arm, above the elbow; the next to that is the PRONATOR TERES, (82.) It rises at (*h*), from the internal Condyle; is implanted into the Radius at (*i*), and turns the hand prone, (*i. e.*) flat down. It is called Pronator Teres, because it has a round fleshy belly, very opposite in shape to the Pronator Quadratus; for the PRONATOR QUADRATUS, (91.) which is seen in the lower drawing, is of a square form, lying flat upon the Inter-osseous Membrane, rising from the Ulna, implanted into the Radius, and having only one direct office, *viz.* that of turning the Radius.

The next muscle to the Pronator Teres, is the FLEXOR CARPI RADIALIS, (85.) or the bender of the wrist, on the side of the Radius. Its head is covered in part by the expanding tendon of the biceps at (*d*); then the rest of the muscle is naked; and its long tendon is seen as it goes along the Radial edge of the fore-arm marked (*k*).

The PALMARIS LONGUS, (83.) is a long, slender, and delicate muscle; it is merely a bender of the wrist; and comes by a small head from the inner Condyle of the Humerus, and its small tendon runs down the middle of the arm till it touches the Annular Ligament of the wrist, to be implanted into it. This Annular Ligament I have marked (\*); but though it has the same mark with the Annular Ligament on the outside of the arm, it is not a continuation of the same Ligament, nor is it like it, but is a short, thick, and very strong ligament passing across from the Pisiform, to the Scaphoid bone of the Carpus. It is shorter and stronger than the Annular Ligament of the outside; it has a firmer origin from two particular bones,

and

and has a deeper arch under it: for the tendons which it binds down are very numerous, and connected with much stronger muscles than those on the back of the hand.

The *FLEXOR CARPI ULNARIS*, (86.) lies along the ulnar edge of the arm; is a pennisiform or feather-like muscle, very fleshy; rises from the inner Condyle along with the *Palmaris Longus*, (83.) and is implanted by a strong round tendon into the projecting *Pisiform Bone*.

The *FLEXOR DIGITORUM SUBLIMIS*, (87.) is a very large thick bellied muscle. It is called *Sublimis*, because it is the outermost of the two flexor muscles. It is seen here lying in its place, thick and fleshy in its belly; its tendons passing under the arch of the *Annular Ligament*, appearing in the palm of the hand, to go to all the fingers; there are four distinct tendons, which are here supported upon a blow-pipe marked (*m*); and the place of the *Flexor Profundus*, which lies under, it is seen at (88.)

In the lower drawing, the muscles of the fore-arm are seen much freer and better.

The *PRONATOR TERES* (82.) is seen in its place, thick, round, and fleshy.

The *PALMARIS LONGUS*, (83.) is thrown out upon the table; by which it is seen how short and delicate its muscular belly is; how long, slender, and delicate its tendon (*n*) from which it has got its name. And the *Palmar Apponeurosis*, or tendinous web, (*l*), which covers the palm of the hand, and which like the palm is of a triangular form, is here cut up and left connected with its tendon.

The *UPPER FLEXOR* of the fingers, or *FLEXOR SUBLIMIS*, (87.) is supported by a ligature, so as to draw its four tendons nearly into a straight line, showing how they are split near the fingers, whence this muscle is often named *PERFORATUS*.

The deep Flexor, *FLEXOR PROFUNDUS*, (88.) is left at its origin. Its belly is raised and drawn out a little, and held extended by a pin; and the three tendons of this muscle are seen going through the loops, or splits of the tendon of the last muscle, whence this one is named *Musculus Perforans*.

These



These tendons of the Perforans and Perforatus are also well seen in the uppermost figure, where the perforating tendons are raised over the blowpipe (*o*), and the perforated tendons are also supported upon another blowpipe (*m*).

The muscle marked (88\*) which seems to go with a particular tendon towards the fore-finger, as if it were a particular Flexor for the fore-finger, is merely that head of the general Flexor which goes to the fore-finger, it is a part of the Flexor Profundus; and this particular appearance is produced merely by dissecting this belly a little too high up; for this muscle, and the Flexor Sublimis also, are divided or diviseable into four distinct bellies, for each of the four distinct fingers which they serve.

The FLEXOR LONGUS POLLICIS, (90.) is a large and strong muscle for bending the last joint of the thumb; its tendon is seen going in under the two short muscles of the thumb, and is seen again at (*q*) escaping from betwixt the short Flexors, and going forwards to the point of the thumb.

The PRONATOR QUADRATUS, (91.) is seen lying flat upon the Interosseous Membrane which is marked (*p*).

The muscles of the HAND are not fully explained, but yet the chief muscles are seen. The ABDUCTOR BREVIS POLLICIS, (103.) is seen in the upper drawing rising from the outside of the Annular Ligament.

The FLEXOR BREVIS POLLICIS, (105.) is seen rising also from the Annular Ligament. Another head rises deeper in the hand, but is not seen here, there is seen only the tendon of the long Flexor, passing betwixt these two heads of the short Flexor.

The OPPONENS POLLICIS, (104.) cannot be seen here, because it does not move any of the joints of the thumb. It belongs only to the Metacarpal Bone of the thumb; and of course it lies under these two.

The ADDUCTOR POLLICIS, (106.) or, that which carries the thumb towards the fore-finger, is also seen here; but so much under shadow, that it is not to be distinguished from the ABDUCTOR INDICIS, (110.) For the Adductor Pollicis and

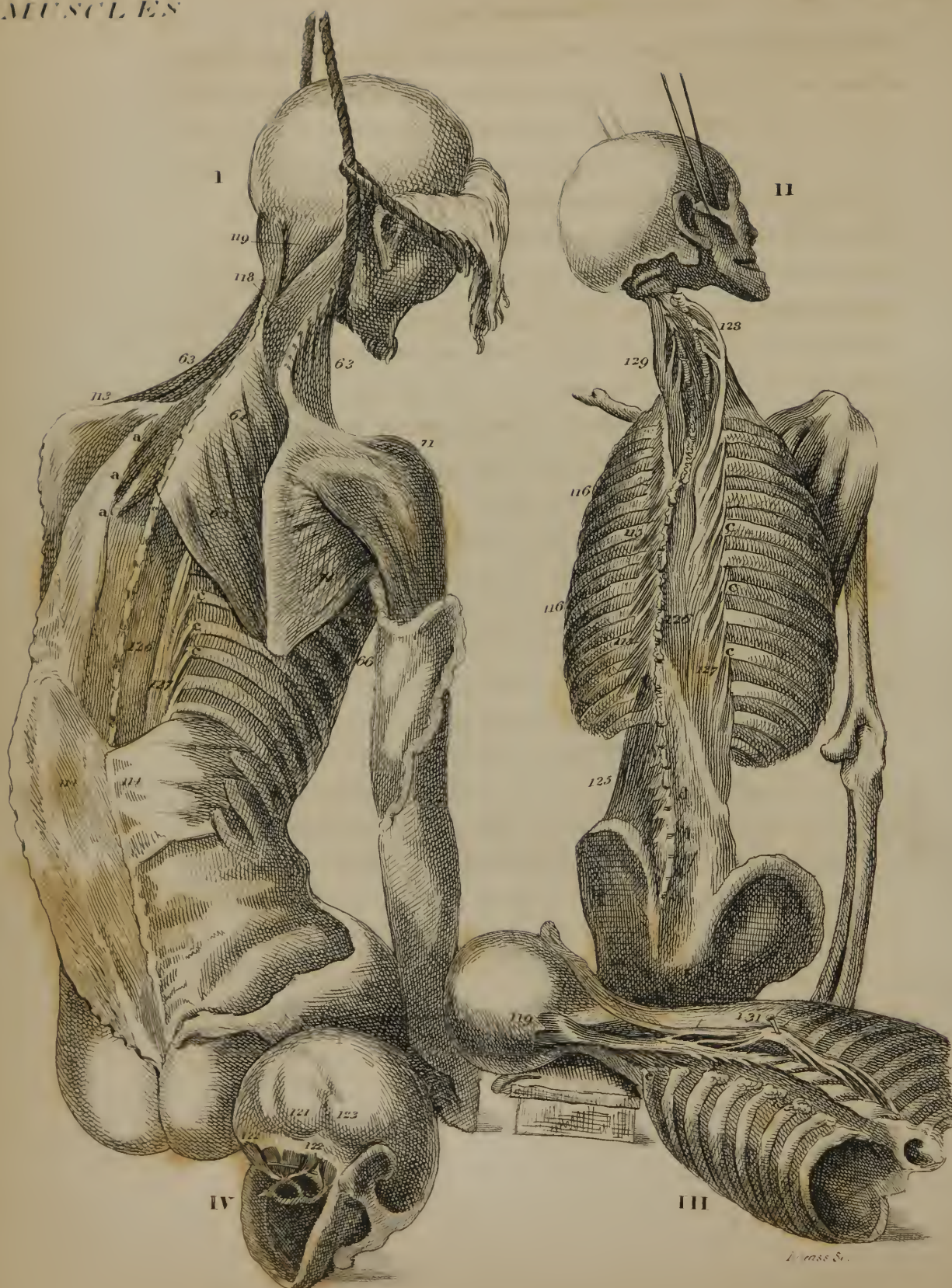
Abductor

Abductor Indicis lie close upon each other, and are of the same flat and triangular shape.

The muscles of the little finger are the Abductor and the Flexor Minimi Digiti; but it is the ABDUCTOR MINIMI DIGITI (107.) only that is seen here, lying on the edge of the palm, under the little finger; which we feel acting, when we spread wide the little finger, or when taken with that slight cramp which we often feel upon the lower edge of the palm.







## P L A T E VII.

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*This Plate explains the Text Book, from page 235, to page 310.*  
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**THIS** plate represents the Trunk of the body in various drawings; explaining those muscles of the Scapula, which lie flat under the Trapezii Muscles;—also the serrated muscles, which raise or depress the ribs in breathing; the **LONGISSIMUS DORSI**, and **Sacro-Lumbalis**, the chief muscles which support the Spine; and it also explains the Intercostal Muscles; the Levators of the ribs; the lesser muscles of the neck and Spine; and the **RECTI CAPITIS**, the small nodding muscles of the head.

It explains a set of muscles, which are found in the book from page 235, to page 310. From page 235 of the book, forwards, are explained the chief muscles of the Scapula; as the Levator Scapulæ, the Rhomboid Muscles, and the Serratus Anticus; and these three are the chief outermost muscles in the dissection represented in figures i. and ii.

The **LEVATOR SCAPULÆ**, (63.) is seen in **Figure I.** on both sides, rising from the Transverse Processes of the upper Vertebrae of the neck, and going downwards to be implanted into the upper corner of the Scapula, whence it is named **Musculus Angularis Scapulæ**.

The **RHOMBOID** muscles, (64. and 65.) are two flat muscles which come with a thin flat tendon from the Spines of the neck and back, and are implanted quite fleshy,

H

but



but still thin and flat, into the whole length of the basis of the Scapula. The division betwixt the cervical portion of this muscle, (64.) which is the *RHOMBOIDES MINOR*, and the larger portion coming from the Spines of the back, and which is named *RHOMBOIDES MAJOR*, (65.) is very slight.

Part of the *INFRA SPINATUS*, (74.) is seen here; the *DELTOIDES*, (71.) is also seen; the *SERRATUS MAJOR ANTICUS*, (66.) or great muscle for moving the Scapula forwards, is seen lying upon the side of the chest, rising from the ribs to pass under the Scapula, where it is implanted into the whole length of the Basis of the Scapula, exactly opposite to the insertion of the *Rhomboides*. But in Figure II. the *Serratus Major Anticus* is represented again lying under the Scapula; and the Scapula, to show it, is cut almost away from the trunk, and is thrown out into a very unnatural position, and the confluence of the separate heads or *Serræ* by which this muscle rises from each of the ribs is indistinctly marked.

Thus the *SERRATUS ANTICUS* is seen to be a muscle belonging to the Scapula; but the *SERRATI POSTICI*, (113. 114.) are muscles of the ribs belonging chiefly to respiration, and they are seen in Figure I. and these muscles of the ribs are explained in the book from page 285, to page 290. The upper Serrated muscle lies flat under the *RHOMBOIDES*; the lower Serrated muscle lies in like manner flat under the *Latissimus Dorsi* muscle; but they cover the *LONGISSIMUS Dorsi* and *SACRO-LUMBALIS* muscles, the lower *Serratus* covering their fleshy bellies, and the uppermost covering their tendons.

The *SERRATUS SUPERIOR POSTICUS* (113.) is seen lying flat upon the side of the neck; on the right side the *RHOMBOIDES* covers it; on the left side it is seen naked. It begins by a neat flat shining tendon, resplendent like the colours of a fish turning in the water; and this flat tendon (which is exactly like the flat tendon of the Rhomboid muscle) comes from the three lower Spines of the neck, and divides into three neat small fleshy heads which are marked (*aa*), and these are implanted into three of the ribs; and by raising three ribs it is plain that they must raise the whole chest.

The



The *SERRATUS INFERIOR POSTICUS* (114.) is the exact antagonist of this, and exactly like it in all respects, only that it goes obliquely from below upwards, to pull the ribs down. It arises by a silvery shining tendon like the upper one; the tendon is very strong, but thinner than a sheet of paper. It ends in three heads, which are thin flat slips of flesh, inserted into the three or four lower ribs a little beyond their angles. The *LEVATORES COSTARUM*, (115.) are concealed by these muscles, but are seen in the next dissection, Figure II. where they are seen to be in number twelve pairs corresponding with the number of the ribs. The nine uppermost are seen to be short; the three lower pairs are seen to pass one rib, and to take hold on the rib below. Whence they are named *LEVATORES COSTARUM LONGIORES*.

The *Levatores Costarum* are these twelve distinct muscles, rising from the transverse process of each vertebra, and going down to lay hold upon each rib; and so they lie flat upon the outside of the ribs, and keep close to the Spine, and are short. But there are besides regular plans of fibres lying in the interstices of the ribs, which go from the edge of one rib to the edge of the other, and fill up the space betwixt the ribs and hence are named *INTERCOSTALS*. The internal intercostals exactly resemble the external intercostals. The external intercostals only can be seen here, and they are seen best in the left side of figure ii. marked (116.) the three lower internal intercostal muscles lying upon the three lower ribs are longer than the others, just as the lower Levators are longer; but it is not so in the outer layer of intercostals which (except in a few straggling fibres) are all of equal length.

The muscles which raise the trunk from the stooping posture, and especially the *QUADRATUS LUMBORUM*, *SACRO-LUMBALIS*, *LONGISSIMUS DORSI*, *TRANSVERSALIS COLLI*, and *CERVICALIS*, are explained from page 297, to page 301, and they are all pretty distinctly marked in figures i. and ii.

In FIGURE I. the *LONGISSIMUS DORSI* (126.) and the *Sacro Lumbalis* (127.) are seen only in the middle of the back; for they are covered by the Rhomboid and *Serratus superior*

superior muscles above, and in the same way by the Serratus inferior Posticus below; but in figure ii. the three great muscles of the Spine, *viz.* the QUADRATUS LUMBORUM (125.) the LONGISSIMUS DORSI (126.) and the SACRO-LUMBALIS (127.) are seen quite uncovered, and in their whole length; for their tendinous origin in the loins at (*d*), their middle bellies at (126, 127.) and their long tendinous insertions at (*c*), are all distinctly seen; and also their connection with the CERVICALIS DESCENDENS (128.) is explained.

The QUADRATUS LUMBORUM, (125.) which is cut away on the right side, is seen distinctly on the left side, arising big and fleshy from the spine of the Ilium, and inserted partly into the transverse processes of the loins, but chiefly into the lowest rib.

The common tendon of the Longissimus Dorsi, and of the SACRO-LUMBALIS, is seen at (*d*); it is a firm, thick, and strong origin, which is thus entirely tendinous without, but fleshy within; it rises from the SACRUM, ILIUM, and transverse processes of the Vertebrae, and fills up all the hollow upon both sides of the Spine.

The belly of the SACRO-LUMBALIS (127.) parts from the belly of the LONGISSIMUS DORSI, (126.) at the top of the loins, nearly opposite to the lowest rib.

The Longissimus Dorsi keeps closer by the Spine, and is inserted by a double row of tendinous feet; but they lie so under its own belly, and under the belly of the SACRO-LUMBALIS, that they are hidden from the view. The tendinous feet of the SACRO-LUMBALIS are well seen, spreading out wider from the Spine and attaching themselves to the ribs; and these tendons marked (*c c*) are seen in figure i. lying flat and regular, each in its right place; but in figure ii. they are more dissected, are torn up a little from the flat surface of the ribs, and hang somewhat loose and flaccid. On the right side of the neck is seen the CERVICALIS DESCENDENS, (128.) rising from the transverse processes of the neck, going down to be implanted tendinous into the back, (*i. e.*) into the ribs. The Cervicalis is inserted under the upper tendons of the SACRO-LUMBALIS, and the Longissimus Dorsi, on the other hand, is seen to send a delicate slip of tendon up into it; so that the Cervicalis seems equally connected with both

both of these muscles, but it is rather more beholden to the Longissimus Dorsi, for this slip; while the accident of the Cervicalis rising under the tendinous feet of the Sacro-Lumbalis makes hardly any connection.

On the left side again there is seen, the TRANSVERSALIS COLLI (129.); which rising from the Transverse Processes of the back, ascends towards the Transverse Processes of the neck; it is rather strong and fleshy, has little connection with any other muscle; the Cervicalis Descendens lies under it, while this the Transversalis is in its turn covered by the Splenius and Complexus\*.

The

\* There are three slender muscles in the neck, which are in danger of being confounded, viz. the TRACHELO-MASTOIDEUS, the TRANSVERSALIS CERVICIS, and the CERVICALIS DESCENDENS. It is impossible to give a perfect drawing on so small a scale, nor indeed is it possible by any drawing, to represent them so that they shall be easily found, and distinguished; perhaps they will best be found by following this order of dissection. 1. The Trapezius and the Rhomboides, the two large flat external muscles belonging to the Scapula, are to be cut away; and then the Serratus Superior where it covers the lower part of the Complexus is to be raised. 2. The Splenius and Complexus are to be dissected and laid aside; and 3. the Trachelo-mastoideus, and the two other muscles come into view. Of these, FIRST, there lies immediately under the Complexus the Trachelo-mastoideus, large and fleshy, rising from the Transverse Processes in the back and lower part of the neck, by tendinous and fleshy feet, and going obliquely upwards and outwards till it is implanted fleshy into the Mastoid Process; and though it is more fleshy than the two muscles which come next, it still is so much a mixture of tendon and flesh, as to be named the Complexus Minor. SECONDLY, there is the TRANSVERSALIS CERVICIS, which lies immediately under the Trachelo-mastoideus, keeps close to the Spine, *i. e.* lies in the hollow by the side of the Spinous Processes. It rises from the Transverse Processes of the back to be implanted in the Transverse Processes of the neck; is immediately covered by the Trachelo-Mastoideus; and covers in part the Cervicalis Descendens.—THIRDLY, there is the CERVICALIS DESCENDENS, which lies more to one side than the Transversalis Cervicis; it therefore lies more properly under the Trachelo-Mastoideus; its feet or tendinous origins begin from the tips of the Transverse Processes of the neck, just where the feet or small tendons of the Levator Scapulæ begin; it is very slender and is a confused mixture of tendon and flesh, being chiefly tendinous, though it is fleshy in part. It is necessary to give this warning, that not even the largest drawing can make this piece of dissection perfectly easy; perhaps it may be the easier for this description and arrangement.



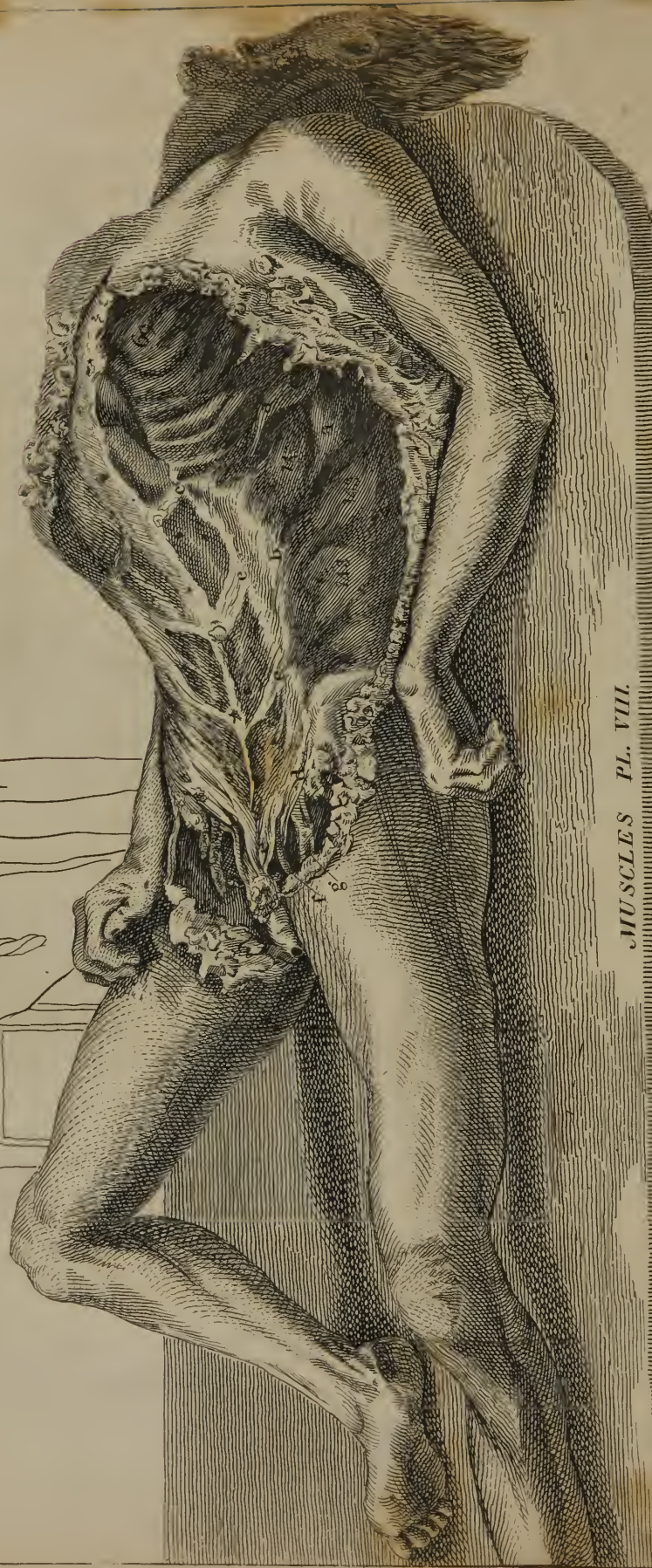
The rising slip of the Longissimus Dorsi has led to this explanation of the Transversalis, and of the Cervicalis Descendens; but naturally before these, there should have been explained the two larger muscles which cover them, *viz.* the Splenius and Complexus, which are best seen in figures i. and iii. In figure i. are seen, the SPLENI (118.) straight and flat, lying along the side of the neck, like the legs of the letter V. and in the interstice or place of their forking, is seen the chief belly of the COMPLEXUS, (119.) where it is implanted into the Occiput, lying under the Splenii. In figure iii. the Splenii are cut away, the Complexus only is seen, the chief belly of the Complexus where it is implanted into the Os Occipitis is marked with its proper number (119.); while its feet (partly tendinous and partly fleshy), by which it rises from the Transverse Processes of the neck and back, are marked (*e e*).

The muscles belonging exclusively to the Spine, are next seen in figure iii. for the chief of them are these two, First, the SPINALIS DORSI, (131.) or long muscle belonging to the Spinous Processes of the back. It runs along the whole back from spine to spine; it is very slender and almost entirely tendinous, and is marked with its number, (131.) Secondly, the MULTIFIDUS SPINÆ, (133.) which is a confused mixture of tendon and flesh, but thick and massy enough to fill all the hollow over the Oblique Processes of the Vertebrae, and betwixt the Spinous and Transverse Processes.

Three of the four small muscles which perform the quick turning and nodding motions of the head, are explained upon the head, figure iv. where the two small muscles called RECTI CAPITIS are seen dissected fairly, and laid over a blow-pipe; and here it will be observed that the two RECTI MINORES (121.) are smaller, and lie deeper betwixt the Atlas and the Skull, that the RECTUS MAJOR (122.) is not, as its name implies, a straight muscle, but is truly oblique. One of the Oblique muscles is also shown here, for there are two oblique muscles, somewhat like the Recti or straight ones. The Oblique Muscle (123.) which is here shown, is the  
Obliquus

Obliquus Superior, which rises from the Transverse Process of the Atlas, to be inserted into the Occiput. The Obliquus inferior, which rises from the Dentatus to be fixed into the Atlas is here cut away, for only the Atlas is left in this drawing.





MUSCLES PL. VIII.

Pub. by A. Curly F. & Co. N.Y.



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*The drawings and plans which are numbered, VIII. IX. X. & XI. explain chapter vi. and vii. of the book, containing the Abdominal Muscles, the Diaphragm, and the muscles of the Perineum. Plate VIII. gives a general view of the Abdominal Muscles, as they are first laid open. Plate IX. gives a second dissection of the Abdominal Muscles, showing the successive layers of the great Muscles which cover the abdomen. Plate X. explains the general appearance of the Diaphragm, and its relation to the body. Plate XI. explains by plans and drawings, the Diaphragm and the muscles of the parts of generation.*

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## PLATE VIII.

**EXPLAINS** the first dissection of the Abdominal Muscles in a lateral view; and the chief intention of the drawing is, to show the general appearance of the belly when uncovered of its skin; to show the great size of the *Musculus Obliquus Externus*, “ and how it covers all the side with “ its fleshy belly, and all the fore-part of the Abdomen with its thin “ expanded tendon;” to explain the two great lines or marks, the *Linea Alba*, and *Linea Semi-lunaris*, and to show the ring of the Abdominal Muscles, and the ligament of the thigh in their true shapes, with the exit of the great arteries of the thigh, and the passage of the *Spermatic Cord*.

The description then of these few parts needs not be tedious.

First, the great belly of the *EXTERNAL OBLIQUE Muscle* of the *ABDOMEN* is marked with its proper number (143.); and it is seen here how it covers the side, how it lies out upon the fore-part of the *Thorax*, and how it rises from the ribs by indigita-

tions, which are marked so dark that they can be understood only by the indigitations (*aaa*) of the *Serratus Major Anticus Muscle*, in the interstices of which they rise.

The belly of this muscle covers only the side, stops suddenly at (*bb*), which represent the flat tendon, the fibres of which go obliquely from above downwards and inwards, whence it is named *OBLIQUUS DESCENDENS*. The letters (*ccc*) show the line which is called *LINEA SEMI-LUNARIS*; and the letters are so placed, as also to point out the intersections or tendinous lines which divide the *Recti*, or straight muscles of the *Abdomen*, into four or five distinct bellies; and consequently the letters (*ccc*) also mark the several bellies of the *Rectus*, shining through the thin expanded tendon of the *External Oblique*.

(\*) Marks the head of the *Rectus Muscle*, where it rises from the border of the *Thorax*, touching the *PECTORAL MUSCLE* (69.), and at the place of this mark (\*), the muscle is uncovered of its sheath; this mark serves also another use, for it is repeated again below near the navel, so that these two marks show the whole length of the *LINEA ALBA*, or white line, which is seen running down all the center of the belly from the *Sternum* quite to the *Pubis*, passing through the navel, and formed by the meeting of the tendons of all the muscles. And it is perhaps worth notice, that the small holes marked very dark, which are neat, small, and round, and which appear in every dissection, like *Oilet Holes*, and are especially frequent over the surfaces of the *Recti Muscles*, are just the openings by which the great *Cutaneous Veins* of the *Abdomen* pierce the flat tendon of the *External Oblique Muscle*, to get to the bellies of the *Muscles* which lie under it, or rather to come back from them, returning chiefly the blood of the *Epigastric Artery*†.

The

† I question whether it be not truly a wound of one of these large veins, (and they are greatly dilated in dropsy of the belly), which occasions that kind of bleeding, which so often happens in tapping the belly.

The tendency of the Oblique fibres of the Abdominal Muscle to split is easily seen, and the manner of its splitting to form the RING of the ABDOMINAL MUSCLES is faithfully represented, where (*d*) marks the lower pillar of the ring; (*e*) the upper pillar of the ring; and it is plain that (*d*) while it forms the lower pillar of the ring, is at the same time the Ligament of the thigh. (*f*) Marks the Spermatic Cord coming through the opening of the ring; (*g*) marks the femoral Artery coming from under Poupart's Ligament, or the Ligament of the thigh. Whence it will be understood how Bubonocoele or Hernia of the Groin, following the course of the Spermatic Cord, will proceed obliquely inwards, and must (in attempting to reduce it), be pushed from within outwards: and how a femoral Hernia will by coming out from under the femoral Ligament, be lodged fairly in the thigh, far from the Groin; lying very deep, apt to be concealed from the Surgeon; and how by following the course of the great vessels of the thigh, the Femoral Hernia will proceed from within obliquely outwards, so that, in attempting to reduce this Hernia, we must push from without obliquely inwards.







## P L A T E IX.

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*This Plate along with the former explains the Text Book, from page 311, to page 323.*  
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**EXPLAINS** the second dissection of the belly; where the muscles being cut and thrown out upon the thighs, may seem irregular and confused, though it is truly the natural order and true appearance of the dissection. The view is not fore-shortened enough to make a pleasant drawing, because it was necessary to look from a high point, as in seeing a dissection from the seats of a Theatre, in order to have a full view of all the belly, from the Pubis to the Sternum.

1. The **EXTERNAL OBLIQUE MUSCLE**, (143.) is entirely cut away, and no part of it remains on either side.
2. The **INTERNAL OBLIQUE MUSCLE** (144.) is seen on both sides; on the left side of the body it is cut up from its insertion, and is thrown down upon the thigh, showing chiefly how thick and strong its fleshy belly is; but on the right side of the body it is left in its place, where the obliquity of its fibres is well seen, and where the chief points of the description are fulfilled in the drawing, viz. that the chief belly of the Obliquus Internus is at the Iliac Spine, that the central fibres only are direct, going across the Abdomen to the Linea Alba; and that the higher fibres ascend

ascend towards the Sternum, while the lower ones go obliquely downwards to the Pubis. This is the muscle which gives that muscular covering of the Spermatic Cord, strong in animals, though weak in man, which is named Cremaster. The testicle of the right side is torn up from the Scrotum, and thrown out upon the thigh, that the connection of the Spermatic Cord with this the Internal Oblique Muscle, might be seen; and although it could not be distinctly expressed in so small a figure, without exaggerating and departing from the true drawing, yet there is a conical form of the Spermatic Cord at its upper end, which shows where the Cremaster Muscle joins it.

3. The TRANSVERSALIS ABDOMINIS, (145.) is seen on the left side. It looks at first sight much like the Internal Oblique, but it is to be remembered, that the Internal Oblique of this side (144.) is thrown down over the thigh. The TRANSVERSE sends all its fibres directly across the Abdomen; and it is seen to belong to the inner surface of the Thorax, as much as the External Oblique Muscle belongs to the outer surface of it. (*a a*) Represent the place where the flesh of this muscle ends, and the tendon begins; and the tendon at this point is strongly attached to the tendon of the inner Oblique Muscle. The letters (*a a*) mark the edge where the two thin tendons adhere to form the sheath for the RECTUS MUSCLE; the letter (*b*) is placed in the sheath itself; the sheath is seen again on the left side empty, and marked (*b b*), with the bowels of the Abdomen shining through the back part of the sheath, which though very dense and strong, is yet thin and almost transparent. But at the lower part (*c*), it is less perfect, or rather is wanting; the thinner membrane of the Peritoneum only being found there.
4. The RECTUS ABDOMINIS, (146.) of the left side remains in its place; it is dissected on its fore-part, so as to show the tendinous intersections (*dd*), where the fore-part of the sheath adheres; but at the back of the sheath, (*i. e.*) at (*b*) there are no such adhesions, and though the Rectus is so attached at the fore-part, as to be

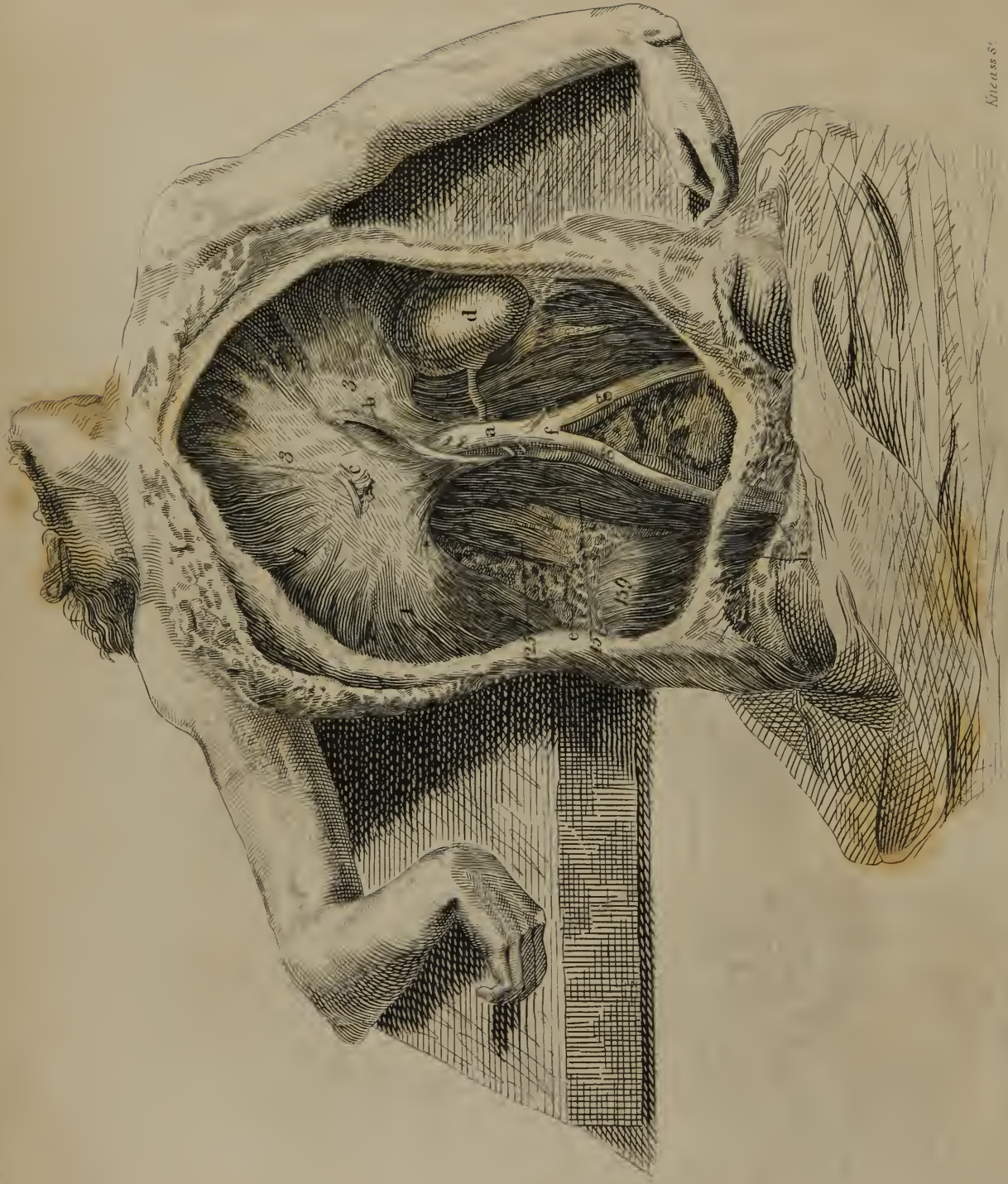
very



very difficultly dissected; it lies at its back part so loosely, that it is easily turned out of its sheath with the point of the finger, or the handle of the dissecting knife.

The RECTUS ABDOMINIS of the right side, (146.) is thrown down like a strap over the thigh, so fully that its tendon by which it is fixed into the Pubis is seen, but not very distinctly here, because the tendon is small, when the Pyramidal Muscles are found, as in this subject.

The PYRAMIDAL MUSCLES, (147.) which are as Supplementary Muscles, are seen fully dissected, with neat, small, and fleshy bellies, of a very regular Triangular form; the base of the Triangle being the origin of the muscle from the Pubis; the Apex of the Triangle being its insertion into the LINEA ALBA, and the mark (\*) is put upon the place of the Symphysis Pubis.



Tab. by A. Frey, Philad. 1815

Kneass sc.



## PLATE X.

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*This Plate explains the Text Book, from Page 323, to Page 328.*  
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THIS drawing explains the Diaphragm in a general way; showing how it stands, “as a Transverse Partition betwixt the Abdomen and the “Thorax;” and how, by its several openings, it permits the Veins, Arteries, and great nerves of the Viscera, to pass from the one cavity to the other; but still it is represented here only in a general way; and though its openings are explained, it is rather with the intention of showing their places, and their relation to each other, than with any intention of describing their particular form; which is more accurately delivered in the next plate.

(1.) Is the upper muscle of the Diaphragm. This upper and greater muscle rises from the inner surface of the Thorax; and besides this origin from the ribs and Sternum, there is also another origin, viz. from the Ligamentum Arcuatum (\*), which ligament is of an arched form, crossing the roots of the QUADRATUS LUMBORUM, (125.) and of the Psoas MAGNUS (157.); so that the greater or. upper muscle of the Diaphragm rises from all the border of the Thorax upon its inner surface, and from this Ligamentum Arcuatum.

K

(2.) The



(2.) The LOWER or POSTERIOR MUSCLE of the Diaphragm rises from the loins by small tendinous heads, which are hidden here by the AORTA (*a*) passing over them; but the fleshy part of this lower muscle is seen with fibres closely surrounding and embracing the Oesophagus.

(3.) The MIDDLE TENDON is seen, but I do not enter upon the detail, nor pretend to represent the crossing of the Tendinous Fibres in this general drawing.

Thus is the Diaphragm, composed of one great and circular muscle before, of one smaller circular muscle behind, and of the triangular tendon betwixt them; and, both in its fleshy and tendinous parts, it is perforated by several vessels, passing reciprocally between the Thorax and the Abdomen.

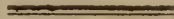
First, (*a*) the AORTA, the great artery of the trunk, passes betwixt the Crura, or legs of the Diaphragm, which like an arch strides over it to defend it from pressure.

Secondly, The OESOPHAGUS (*b*), which passes through the Diaphragm, a little above the Aorta, and a little towards the left side. Its passage is by the hole (*b*) through the lower fleshy belly, and through the most fleshy part of the Diaphragm, and the muscular fibres of the Crura Diaphragmatis first cross under the hole for the Oesophagus. They surround it, then cross again above the hole, so that they form the figure of 8; and the Oesophagus is so apparently compassed by these surrounding fibres, that some anatomists have reckoned this a sort of Sphincter for the upper orifice of the stomach.

Thirdly, The GREAT VENA CAVA; (*c*) (both that branch of the Great Vena Cava, which belongs to the Liver, and that also, which comes from the lower extremity) goes up to the right side of the heart, through the right side of the Diaphragm by the hole (*c*), where a part of this great vein is seen hanging down with a flaccid and open mouth; and this hole (*c*), being of a triangular form, passing in the hard tendon, and being larger than the vein requires, there is no danger of the vein being strangulated.

(*d*) Is

- (*d*) Is the Left Kidney.
- (*e*) Is the Cellular Substance in the loins, in which the right kidney lies, the kidney of that side being torn away.
- (*f*) Is the Bifurcation of the Aorta a little above the top of the Sacrum, and (*g*) the two Iliac arteries.
- (159.) Is the ILIACUS INTERNUS MUSCLE, and (*h*) shows the manner in which the Iliacus Internus, Psoas Magnus, and Femoral Artery, come out from under the Femoral Ligament.



The anatomy of the Diaphragm is continued in the next plate.





Amross S.





## P L A T E X I.

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*This Plate explains the Text Book, from Page 325, to Page 335.*  
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THIS plate consists of plans of the Diaphragm, and Parts of Generation.

The first figure is a drawing of the Diaphragm, neatly dissected and taken out of the body; explaining all its origins, and all its holes more correctly than plate x.

The second figure is rather a plan than a drawing, and may be very useful to the young anatomist, in giving him correct notions of the general form of the Diaphragm, how it stands slaunting upon the whole; convex towards the chest, concave towards the belly, and moving (as it may easily be conceived by this drawing,) so as to perform respiration, and all the lesser functions that depend upon it.

And the third figure explains the muscles which belong to the parts of Generation. This is by no means a plan merely, as might be conceived from the formal shapes of these muscles, but a true drawing after several careful dissections, where, though the parts seem formal, they are really natural, not exaggerated nor caricatured, but delivered fairly and honestly as they must always be seen after a right dissection. And they are exposed in such a posture, as by its correspondence with that  
for

for Lithotomy will at once convey a lesson of surgery, while it gives correct and true ideas of these parts.

## FIGURE I.

### DRAWING OF THE DIAPHRAGM.

The parts pointed out along with the Diaphragm marked (145.) are parts of the Transverse muscles of the Abdomen, which, being internal muscles and rising from the inner surface of the Thorax, have their tongue-like origins (*aaa*), which come from the ribs, mixed confusedly with (*bbb*), the tongue-like origins of the great muscle of the Diaphragm, which tongue-like origins (*bb*) come from the same ribs; and it was from this connection with the two Transverse Muscles of the Abdomen, that the Diaphragm was once reckoned a Trigastic Muscle; *Vid.* Book of the Muscles, page 315.

- (1.) The greater, or upper muscle of the Diaphragm, has these five origins; on both sides (*bbbb*) mark the flesh which rises from the ribs, from the inner surface of the Thorax, indigitated with the origins of the Transverse Muscle; (*ee*) mark the two backmost portions of the great Anterior Muscle, and these two portions rise from the two Ligamenta Arcuata, which stretch over the origins of the QUADRATUS LUMBORUM and Psoas Muscles. And (*f*) marks a fifth portion of the greater muscle, which rises from the inner surface of the Sternum and Xiphoid Cartilage.
- (2.) The lesser muscle rises by four tendinous feet from the fore-part of the Lumbar Vertebræ; and these, the CRURA DIAPHRAGMATIS (*gg*), which surround the trunk of the Aorta, and their tendinous feet (*hhh*) are very fairly represented here, for they are not nicely cut and pared into distinct feet, but are represented as they are taken up from the face of the Lumbar Vertebræ; that is, not in the shape of  
four

four distinct tendons, but adhering to each other in the form of a sort of dense tendinous membrane, very white and glistening; forming a sort of sheath over the fore-parts of the Vertebræ; having flat strings, which are thicker and stronger, and more brilliant than the others; but not to be separated (without violence), into the shapes of distinct feet.

The tendinous feet of the Diaphragm (*h h*), unite into the Crura at (*g g*), and the two Crura, growing gradually more fleshy, form at (*i i*) the Posterior Muscle of the Diaphragm; and it is here, that the fibres of this posterior or lesser muscle cross and mix, and surround the hole for the Oesophagus, with those fibres, which by their crossing, describe irregularly the figure of eight; and by their compressing the Oesophagus form a sort of Sphincter.

(3.) The CENTRAL TENDON is composed of fibres, "which come from the various Fasciculi of this muscle, and meet and cross each other with a confused interlacement which Albinus has been at much pains to trace, but which Haller describes much more sensibly, as *Intricaciones variæ, et vix dicendæ*; irregular and confused crossing chiefly at the openings, and especially at the Vena Cava, the triangular form of which seems to be guarded in a most particular way." *Vid.* book, page 327. And the figure (3, 3.) is repeated upon the surface of the tendon, to show the various Fasciculæ of the tendinous fibres, which are truly, "*variæ et vix dicendæ*," and which it were not only difficult, but useless to describe.

(*k*) Is the Aorta, where it comes out from the Thorax into the Abdomen; it is here flaccid, and uninjected. Its first branches, *viz.* the Cæliac, and upper Mesenteric Arteries are seen going off at this point. It was drawn aside to show the hole through which it passes, and was fixed so by a pin.

(*l*) Is the hole, by which the Oesophagus passes, left empty.

(*m*) Is the hole, by which the Vena Cava passes through the tendinous center of the Diaphragm.

In



## FIGURE II.

In this FIGURE, the Diaphragm is drawn in a new posture; for the trunk (*viz.* the Pelvis and Thorax, with the intermediate Vertebrae of the loins) is set almost upright. And first, the Convexity of the Diaphragm, towards the Thorax (*a*), should be observed. Secondly, the obliquity of the Diaphragm should be observed; its greater muscle rising from all the borders of the Thorax, as at (*b b*), while its Crura and tendinous feet rise near the top of the Pelvis, from the lowest Vertebra of the loins. Thirdly, the true appearance of the tendinous feet is marked, the longest lying in the middle, and the shorter ones being more to the side; so that (*c*), the longest one, lies fair upon the fore-part of the Vertebra of the loins, and rises almost from the lowest Vertebra; while the shortest one (*d*) rises from the Transverse Process of the fourth Vertebra of the loins.

## FIGURE III.

The third figure of this plate explains the muscles of the parts of generation, the hips and thighs being presented as in the operation of Lithotomy.

For the full explanation of these muscles, the student must turn to the Book of the Muscles, chapter vii. page 329. where he will find that,

(1.) The **ERECTOR PENIS** (150.) is a delicate and slender muscle about two inches in length, rising from the Tuberosity of the Os Ischium (*a*); lying along the root of the **CRUS PENIS**, where it is smallest; inserted into the **Crus Penis**; being very small, and almost pointed both at its origin, and at its insertion\*.

(2.) The

\* Haller will not allow this muscle the name of Erector; he says it does not draw the Penis back to the Pubis, but that its office rather is to depress the Penis, and hold it down to the

- (2.) The *TRANSVERSALIS PERINÆI*, (151.) rises along with the *Erector*; from the *Tuber Ischii* (*a*), it crosses the deep hollow which is betwixt the *Ischium* and the *Anus*; and is fixed into the backmost point of the bulb of the *Urethra*.
- (3.) The *ACCELERATOR URINÆ*, (152.) is a double muscle; or a pair of muscles one lying upon each side of the bulb of the *Urethra*, so that the whole fairly surrounds the bulb. And indeed this tumor of the bulb seems chiefly formed to favour the action of the *Accelerator Muscle*; and the two slender and horn-like tendons of the *Accelerator* are seen plainly turning off from the cavernous body of the *Urethra* (*b*) to go out upon the cavernous body of the *Crus Penis* (*c*), by which hold it plays more powerfully upon the bulb. We feel the actions of this muscle very plainly in the throwing out of the last drops of urine, as well as in the ejaculation of the *Semen*; and its great power of throwing the *Semen* to a distance has been ascertained by experiments, such as should not be repeated nor mentioned, indeed, except in that language in which they were told. “*Constat enim per experimenta, ob turpitudinem non repetenda, multo longius semen de sano et dudum casto homine proselire quam abest uterus.*” The *SPHINCTER ANI* (153.), is seen surrounding the opening of the *Anus*.

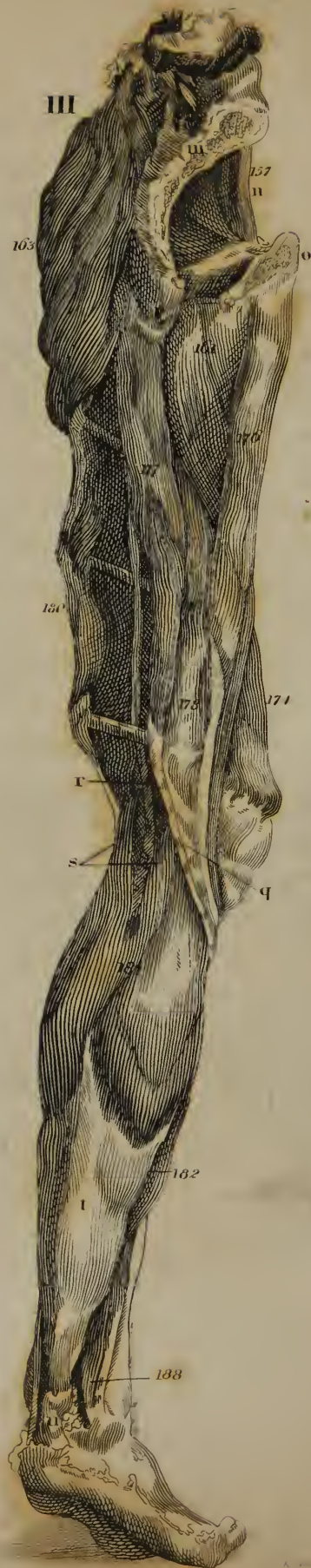
Wounds of these muscles are attended with no degree of danger, nor followed by any kind of incapacity, but yet it is very manifest, that since the incisions for *Lithotomy* should be made in one regular and uniform line, these muscles will be cut by every dextrous operator in one certain way; and the naming them wrong must be a mark either of ignorance of these parts, or at the least, of a bad irregular operation. Now, as the aim of the *Lithotomist* is to get into the bladder by that great hollow which lies betwixt the *Tuberosity* of the *Os Ischium* (*a*), and the *Anus*

the proper angle, for entering the *Vagina*. What a pity it is that the illustrious author had not ascertained this curious angle! for we should naturally conceive, at least from what we see after our injections, that the *Penis* when in full erection, stood up to the *Pubis* as close as it could lie.

Anus (*d*); the incision must pass exactly in the middle betwixt the Tuber and the Anus. The Transversalis Perinæi must be fairly cut across; the Accelerator will be spared; the Erector cannot be cut; and the operator who cuts the Accelerator, keeps his knife too near the Anus, and wounds the bulb. The operator who speaks of cutting the Erector, either must be very ignorant of this same Erector, or must intend to cut upon the Tuberosity of the Ischium, hoping perhaps to cut through the bone: But what shall we think of a surgeon, who speaks about things of this kind so loosely, as to talk of cutting both the Erector and the Accelerator Muscle; that is of cutting both that muscle which lies on the outside of the common incision, and also that one which lies on the inside of the common incision? After reading this in any author, one might be inclined to turn backwards a page or two, to see whether he made an incision like that of Celsus; *viz.* in the shape of a half-moon.







## P L A T E   X I I .

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*This Plate and the next explain the Text Book, from Page 336, to Page 384.*  
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## OF THE LOWER EXTREMITY.

IN this plate are explained the chief muscles of the Thigh, Leg, and Foot.

The limb is hung by a rope, the foot swinging in the air, the ball of the great toe touching the ground. The leg is presented twice. In a fore view showing the great fascia of the thigh dissected back, and the muscles naked, Fig. i. And again, in a back view, Fig. ii. showing the cavity of the Pelvis; the hollow betwixt the Ham-string muscles, and the bellies of the Gastrocnæmii with the great Achilles Tendon. The explanations cannot be orderly, and therefore they should be short.

In FIGURE I. (*a*) marks the Spine of the Ilium; (*b*) the crest of the Pubis; (*c*) the ligament of Poupart which runs betwixt these two points; (*d*) the Femoral artery passing under the ligament. The muscles which appear on the fore-part of the thigh are these.

The RECTUS (171.) lying in the middle of the thigh, having a white and tendinous part in the center, and the fleshy fibres going in towards it.

The



The **VASTUS EXTERNUS** (173.) making all the flesh on the outside of the thigh.

The **VASTUS INTERNUS** (174.) making that cushion of flesh, which is so prominent upon the inner side of the knee joint, and which makes so particular a mark in the drawings of the thigh: and all these three muscles, viz. the **Rectus**, **Vastus Externus**, and **Vastus Internus**, are inserted together into the **Patella**, which is marked (*e*).

Then the **SARTORIUS** (175.) is seen rising from the highest point of the **Os Ilium**; crossing the thigh, long and slender like a strap, and bending down the **Vastus Internus** Muscle.

The head of the **Gracilis** (176.) where it rises from the **Pubis** is here seen;—next to that is seen the first head of the **TRICEPS** (161.); and next to that the **PECTINALIS** (160.) with the artery of the thigh lying flat upon its belly.

These are the chief muscles on the fore part of the thigh; they are naturally covered with the **FASCIA**, or broad tendinous expansion, marked (*f*), and the **FASCIALIS MUSCLE**, which, from its making this vagina tense, is named **Tensor Vaginæ Femoris**; is marked with its appropriated number (156.), and is drawn out along with the fascia, and is seen rising from the same point of the **Os Ilium**, from which the **Sartorius** rises.

In the **LEG**, (*g*) marks the **Tibia**; and the muscles are,

The **GASTROCNÆMIUS**, (181.)

The **TIBIALIS ANTICUS** (187.), which comes from the fore part of the **Tibia**, crosses the ancle obliquely, goes over the side of the foot to be implanted into the root of the great toe; and this is the tendon which makes that sharp angle on the fore-part of the ancle where the buckle lies.

The **EXTENSOR POLLICIS** (196.) lies next to the **Tibialis**, and its tendon passes like that of the **Tibialis Anticus** under the **Annular Ligament** of the ancle, which is marked (*h*); and next to the **Extensor Pollicis** lies the **EXTENSOR LONGUS DIGITORUM PEDIS** (193.) which lies deeper still, and more towards the outside of the leg. Its tendons are seen going out to each of the toes, and these tendons are accompanied with the  
tendons

tendons of the little muscle the *EXTENSOR BREVIS DIGITORUM PEDIS* (195.), which is seen lying under the tendons of the long muscle.

Behind the *Extensor Digitorum*, and hiding it in part, is the *PERONEUS LONGUS* Muscle (184.), which belongs to the brawn of the Leg, and the tendon of which passes down behind the outer angle.

In the foot, Fig. II. lying under this one, is explained the *Plantar Aponeurosis*, or that fascia which belongs to the sole of the foot; and which is described in the *Book of Muscles*, page 382. It is seen here to consist of three general divisions, the middle one (*i*), the lateral one (*k*) on the outside, which covers the *Flexor*, and the *Abductor Minimi Digiti*; and the lateral one (*l*) on the inside, which covers the *Flexor* and the *Abductor Pollicis*.

The general *Fascia* where it covers the thigh is marked (*f*), but it is merely a continuation of the same fascia that covers the leg; and where it covers the leg it is marked (\*); and it is still the same fascia which being continued over the fore-part of the foot, is there strengthened by its adhesion to the outer and inner angles, by which, taking a new form it becomes the *Annular Ligament*, so that the *Annular Ligament* is merely a strengthening of the common fascia.

### FIGURE III.

THIS view shows chiefly the muscles upon the back part of the thigh and leg. The *Vertical Section* of the *Os Sacrum* is marked (*m*); the hollow of the *Pelvis* is marked (*n*); the *Vertical Section* of the *Os Pubis* is marked (*o*); and the letter (*p*) is put down upon the *Tuberosity* of the *Os Ischium*, which could not be clearly marked. And the muscles are,

The *PSOAS MAGNUS* (157.); crossing the brim of the *Pelvis*, to go down into the thigh. The *GRACILIS* (176.), which is seen coming from the arch of the *Pubis*, and going down to be inserted by a delicate and slender tendon, into the head of the *Tibia*.

The

The first and second heads of the **TRICEPS**, (161.) are seen from behind.

The **SEMI-MEMBRANOSUS** (178.) is next seen; but the whole of it is not seen; nothing is bare here but the middle and lower parts of the muscle; but there is enough of it to show that it is not as its name imports, a muscle having a membranous appearance, it has on the contrary a very thick fleshy belly.

The **SEMI-TENDINOSUS** (177.) is next to it, and the reason of its being named Semi-tendinosus is seen in the length of its tendon (*q*). The Semi-membranosus and the Semi-tendinosus form together the inner ham-string. The outer ham-string is formed by the Tendon of the **Biceps Cruris Muscle**; and the belly of the **Biceps** (180.) is seen held out by three sticks, so as to show the deep hollow betwixt the ham-strings, in which is seen hanging the great **SACRO-SCIATIC NERVE** (*r*); where it is going down the back of the thigh, to pass down under the heads of the **Gastrocnemii Muscles**.

The **GREAT GLUTEUS MUSCLE** (163.) is seen upon the hip dissected, so as to show the order of its fibres, and hanging like the rest of the leg all loose and flaccid.

The **VASTUS INTERNUS** (174.) is also seen making a fleshy belly just over the knee-joint.

The two bellies of the **GASTROCNEMIUS MUSCLE** (181.) are seen rising each from its own Condyle of the thigh bone at (*ss*), and meeting together to be joined into the great Achillis tendon (*t*); which grows gradually smaller as it goes downwards to be implanted into the heel at (*u*), where still it is very thick and strong.

The great belly and tendon of the **FLEXOR POLLICIS** (188.) is also seen passing behind the inner ancle.

A part of the belly of the **SOLÆUS** (182.) is seen lying under the belly of the **Gastrocnemius**.

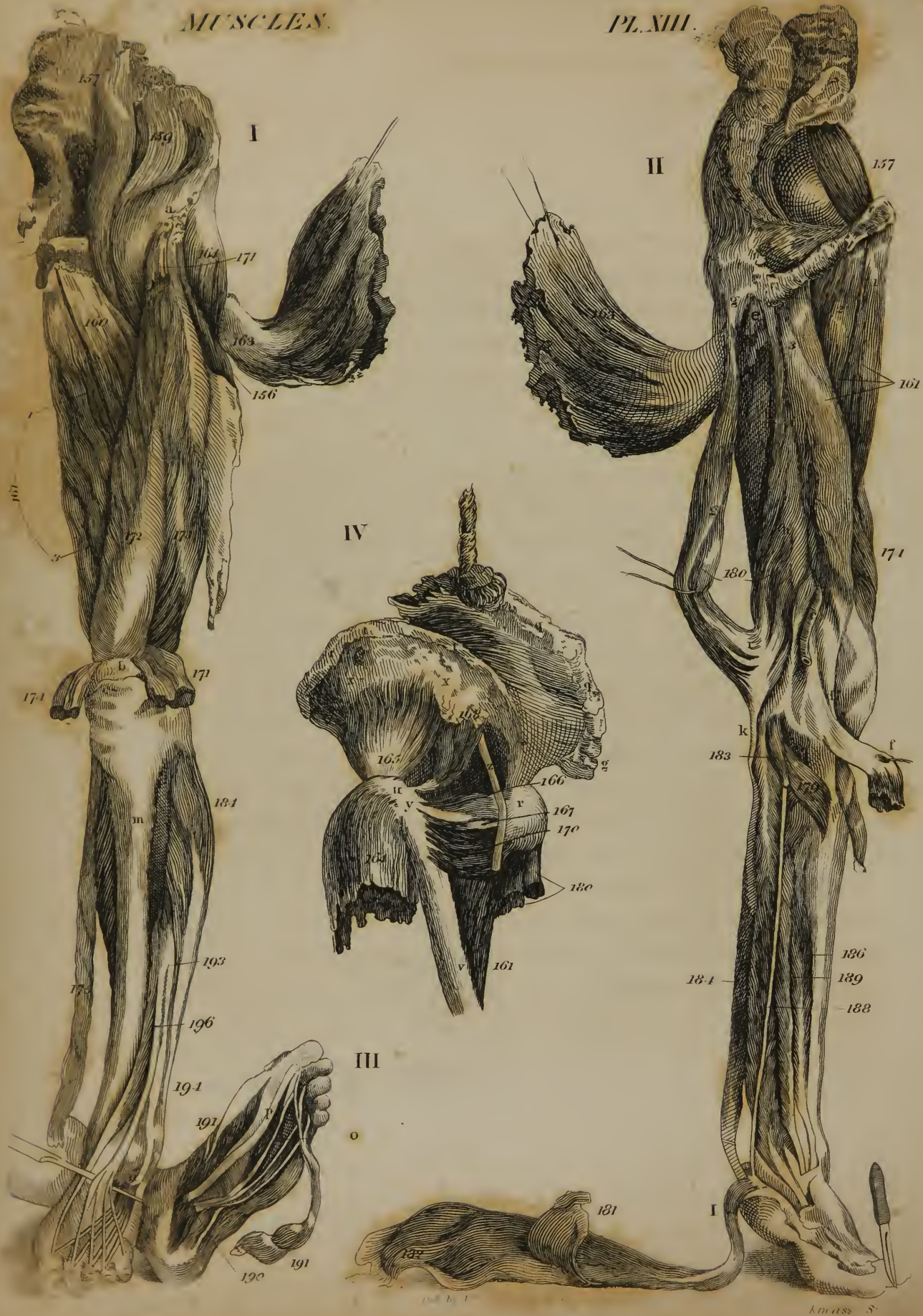
The foot in this drawing is left covered with skin, and puffed, and ill shaped, as it naturally is, while under dissection.





*MUSCLES.*

*PL. XIII.*





## PLATE XIII.

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*This Plate explains the Text Book, from page 336, to page 384.*  
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SHOWS the deeper muscles of the THIGH, LEG, and FOOT, also in two drawings; one representing the fore, and the other the back-parts of the leg. This is a fuller dissection than the last, so that it differs greatly in general appearance from the last drawing, but still the general position is exactly the same.

IN FIGURE I. are seen,

The GLUTÆUS MAXIMUS (163.) now dissected, and cut away from its origin in the haunch bone, left at its insertion into the thigh bone. It is hung out by a string, and the shape, which it falls into, shows that it is one of the heaviest and fleshiest muscles in the body; a part of the Glutæus Medius (164.) is seen under it.

The RECTUS FEMORIS, (181.) is now cut away, and nothing of it is left here, but its origin from the Spinous Process marked (*a*); and its insertion into the Patella, which is marked (*b*) is thrown down and left hanging. By the throwing down of the RECTUS FEMORIS, the great mass of the CRURÆUS (172) which lies under it is exposed, and it is seen that the Cruræus consists partly of tendon and partly of flesh, extends all along the thigh, rises from the thigh bone, lies immediately under the Rectus, and is inserted along with it into the Patella; and here the VASTUS EXTER-

NUS



NUS (173.) is seen in its place. The VASTUS INTERNUS (174.) is cut and thrown down, and left hanging over the knee like the Rectus.

The SARTORIUS (175.) is also cut away from the Ilium, and left hanging down along the leg.

The FASCIALIS (156.) is seen here also with a rag of its fascia connected with it.

The PSOAS MAGNUS (157.) which comes from the sides of the Lumbar Vertebrae, and the ILIACUS INTERNUS (159.) which comes from the inside of the haunch bone, are seen turning over the fore-part of the Pelvis together to go down through among the flesh of the thigh, to the lesser or inner Trochanter of the thigh bone.

The PECTINALIS (160.) is seen rising from the Pubis, and stretching flat and direct towards the thigh bone.

The TRICEPS LONGUS marked (1.), as it is the first head of the Triceps Femoris, (161.) is seen here thick, and fleshy. This covers the other two heads of the Triceps, viz. the Triceps Brevis, and Triceps Magnus; the edge of the TRICEPS MAGNUS, or third head of the Triceps, is seen here, (3.); but the TRICEPS BREVIS or second head of the Triceps is here entirely covered by the Pectinalis and Triceps Longus, and is seen only in the second drawing, where it is marked (2.)

The muscles on the back-parts of the hip and thigh, are explained in figures ii. and iv.

In FIGURE II. we have the GLUTEUS MAXIMUS (163). hung out by a string as in the other drawing. The PSOAS MAGNUS (157.) crossing the brim of the Pelvis as in the former drawings; the Triceps Longus marked (1.) descending from the Pubis, to the middle of the thigh bone; behind that is seen the Triceps Brevis, vel secundus, (2.) the second head of the Triceps, which is held as a part of the same muscle, though it lies behind the first, and is of a different layer; and behind that still lies the TRICEPS Magnus (3.), which has also very little connection with the other heads, but it is called the third head of the Triceps; and there is seen the Femoral Artery marked (c) passing through the Triceps Magnus from the fore to the back part of the thigh; the artery is marked (c), and the tendon of the Triceps Magnus, where it is implant-

ed

ed into the inner Condyle of the thigh bone, is marked (*d*); so that the artery passes through the Triceps from the fore to the back part of the thigh, only a little above the knee.

The root of the Semi-membranosus (178.) is seen at (*e*), where it rises by a thick and fleshy head from the Tuberosity of the Os Ischium; the lower end of it where it is attached to the head of the Tibia is cut, and hangs down at (*f*).

The opposite Ham-string Muscle the Biceps (180.) is seen; its bellies are marked with the proper number of the muscle. Its longer head is seen rising in common with the Semi-membranosus from the Tuberosity of the Os Ischium at (*g*); the longer head is marked (*g*), but the shorter head of the Biceps which rises from the back of the thigh bone, is marked (*h*); the place where the long and the short heads of the Biceps Femoris unite and mix their fibres is marked (*i*); and the tendon of the Biceps which forms the outer ham-string is marked (*k*).

All the ham, or the back part of the knee-joint, is now exposed by the throwing down of the conjoined muscles, the GASTROCNEMIUS EXTERNUS (181.) and the SOLÆUS, (182.) which are left only at their insertion by the great Achillis Tendon (*l*), which is fixed into the heel bone; and the Gastrocnemius and Solæus being thus thrown down, the two curious muscles which lie in the ham are exposed, *viz.* the PLANTARIS (183.) which rises from the outer Condyle of the Os Femoris, has a very small delicate fleshy belly, like that of the PALMARIS LONGUS. It has also a small round tendon like it, the smallest and longest in the body, not grosser than a fiddle-string; which going down along the inner surface of the Gastrocnemius, and making an impression upon the inner surface of the great Achillis Tendon, accompanies it to the heel, where it is implanted along with it.

The other small muscle is the proper muscle of the ham, which is thence named MUSCULUS POPLITÆUS (179.) It is a beautiful triangular muscle, which lies exactly upon the back part of the joint as a sort of guard to the Capsule, and like a check band for supporting the knee. It comes from the outer Condyle along with the

little

little belly of the *Plantaris*, crosses the joint with oblique fibres; comes from the Condyle of the thigh bone; is inserted into the back of *Tibia*, and so bends the knee.

In the legs of both drawings, the following deep seated muscles are seen. In the first leg, the deep muscles of the toes which lie under the *Tibialis Anticus*, and they are all extensors of the toes. In the second leg the deep muscles which lie under the *Gastrocnemius* and *Solæus*; and they are all flexors of the toes.

In *FIGURE I.* is seen (*m*), the place upon the fore-part of the *Tibia*, from which the fleshy belly of the *TIBIALIS ANTICUS* is cut away, so that the next muscle the *EXTENSOR POLLICIS* (196.) is seen, which is a long, penniform, and very strong muscle; and its long tendon is seen going to the great toe.

Behind that again, lies the *EXTENSOR LONGUS DIGITORUM PEDIS* (193.), which has its fleshy belly lying behind the *Extensor Pollicis*; and its four tendons are raised over one leg of the compasses, so as to expose the short flexor which lies beneath, upon that part of the foot where the buckle rests; and which is seen beginning by a small head (*n*), from the heel bone. Behind the *Extensor Digitorum* lies a third muscle, which is like a slip of the *Extensor*, but its tendon does not run into the toes. It is fixed into the side of the foot at the root of the little toe, it is therefore a bender of the foot, and from its rising from the *FIBULA*, is named *PERONEUS TERTIUS* (194.)

And Lastly, in this figure, a part of the *PERONEUS LONGUS* (184.) is seen, a muscle which rightly belongs to the other side of the leg, and the tendon of which passes behind the outer angle, to go down into the sole of the foot.

In *FIGURE II.* are seen, in like manner, all the long flexors of the toes and foot.

First the *TIBIALIS POSTICUS* (186.) begins with a strong fleshy belly upon the back part of the *Tibia*; is penniform like most of these long muscles of the leg; and sends a long tendon down behind the inner angle, which runs in a particular ring of the Ligaments that are behind the angle; and, getting into the sole of the foot, is fixed by many spreading roots into the several bones of the *Tarsus*.

The



The **FLEXOR LONGUS DIGITORUM PEDIS** (189.) lies immediately behind this; is like it in all points; sends its long slender tendon down also behind the ancle in its own peculiar ring, but, passing the bones of the Tarsus, it divides into four tendons, which go to each of the lesser toes.

The **FLEXOR LONGUS POLLICIS PEDIS** (188.) is the appropriated muscle of the great toe. It has a large fleshy belly, a very strong big tendon, and runs by the inner ancle in its own peculiar ring. Now it is to be noticed, that this Flexor Pollicis, though the flexor only of one single toe, is much bigger than the common flexor of all the toes. It is even bigger than both these, or the **Tibialis Posticus**, which is the great muscle of the foot. The meaning of which is very plain; *viz.* that these muscles of the toes are to be considered not so much as mere benders of the toes; for when we observe how little the toes move, and how much walking consists in rising upon the ball of the great toe, we shall regard these muscles rather as benders of the whole foot. It is by the power of these muscles, that we beat the ground in each step in walking, for in walking each push in carrying the body is made by the pressing of the ball of the great toe against the ground; and these muscles all press down the ball of the great toe. In making the step, these flexor muscles of the toe, and foot, are chiefly assisted by a muscle belonging to the other side of the leg, I mean the **PERONEUS LONGUS** (184.), which rises not like these, from the back of the Tibia, to pass behind the inner ancle, but from the whole length of the Fibula, whence its name of Peroneus, and passes down in a ring behind the outer ancle; and this strong tendon which makes the sharpness behind the outer ancle, and gives shape to the leg, is here drawn out with a string just where it is descending into its sheath or ring.

Thus all the muscles which bend the foot, and so raise the body at each step, are distinctly seen in this dissection; *viz.* The **GASTROCNEMIUS** (181.) the **SOLÆUS** (182.) and the **PLANTARIS** (183.); the **TIBIALIS POSTICUS** (186.) **FLEXOR DIGITORUM** (189.) **FLEXOR POLLICIS** (188.) and **PERONEUS LONGUS** (184.) There is but one more,

more, the *Peroneus Brevis*, which is so exactly like the *Peroneus Longus*, that its not being seen in this view, is hardly an imperfection, the demonstration being sufficiently full.

The foot is dissected in Figure iii. where is seen first the short Flexor, the *FLEXOR BREVIS DIGITORUM PEDIS* (191.), cut up from the heel bone where it has its origin; its fleshy belly is thrown out; its short neat tendons are going to each of the toes; its tendons are perforated like those of the hand, for the transmission of the tendons of the long Flexor. The tendons of the long Flexor are marked (*o*); they are seen going forwards to thread the loops, made by the short tendons; and there is seen connected with the long Flexor that short supplementary muscle which comes from the heel bone, and which being irregular in its form, is called the *MASSA CARNEA JACOBI SILVII* (190). The *Lumbricales* are too delicate to be seen in a small drawing like this, but they are easily found in dissection; for they are like a continuation of the *Massa Carneæ* lying in the forks of the tendons.

The tendon of the long Flexor of the great toe is seen here (*p*), escaping from under the inner angle, and appearing upon the sole of the foot; and it is seen to be connected here (by a small slip of tendon) with the long Flexor of all the toes. This tendon of the long Flexor of the great toe is seen to pass betwixt the two heads of the short flexor, which is marked with its proper number (191.) The *Abductor* of the little toe is also seen.

There remain to be explained, certain muscles which immediately surround the hip joint; and which are described in the book from page 347, to 352.

The *TROCHANTERS* are so named, because they are placed so that most of the muscles which are implanted into them, at the same time that they bend the thigh, turn it also.

These muscles are explained by figure iv. The Pelvis is hung up by a rope, put round the *Lumbar Vertebrae*; and the points of bone to be observed as explaining the posture are, (*q*) the line of the *Os Sacrum*, and *Os Coccygis*; (*r*) the tuberosity

of

of the Os Ischium; (*s*) the Sacro-Sciatic Ligament passing from the Sacrum, to the Ischium; (*t*) the Spine of the Ilium; (*u*) the great Trochanter of the Thigh Bone; and (*v*) the shaft of the same bone.

And the muscles that are seen are,

FIRST, the GLUTÆUS MEDIUS (164.) cut away from its origin, which is from the Os Ilium at (*x*); the great Glutæus, which rises from the Sacrum and Ilium, from (*g*) to (*t*) being cut entirely away. The middle Glutæus (164.) is seen to be implanted into the very Apex of the Trochanter; the GLUTÆUS MINIMUS (165.) which lies under it, rises again from that part of the Os Ilium that forms the socket for the Thigh Bone; and is of course the deepest, and the smallest of these muscles.

Behind the GLUTÆUS MINIMUS is seen the PYRIFORMIS (168.); and the reason of its name, taken from its Pyramidal form, is well explained; and its broad thin belly is seen coming from the hollow of the Sacrum within the Cavity of the Pelvis; and its small flat tendon is seen inserted into the root of the Trochanter Major.

The QUADRATUS FEMORIS, (170.) a short and square muscle, is seen coming from the tuberosity of the Os Ischium, and implanted into the greater Trochanter.

The muscles, named Marsupiales, are seen going into the Trochanter at the point marked (*y*); and I do not put their right numbers (166.) (167.) upon them, lest it should confound so small a drawing. Besides, it will be easily enough understood, that the white tendon, marked (*y*), is the tendon of the Obturator Internus, which comes from within the Pelvis, turning over the tuberosity of the Os Ischium; and the little fleshy slips above and below this white tendon, and inclosing it upon either side, are the GEMINI MUSCLES (166.) (167.), one above, another below the Obturator Internus, and all the three inserted together into the root of the Trochanter at the point (*y*). A part of the TRICEPS FEMORIS is marked (161.); the heads of the Biceps, and of the Semi-tendinosus, and Semi-membranosus,

where



where they all three rise together from the tuberosity of the Os Ischium, have the mark of the Biceps only, which is (180.)

The SACRO-SCIATIC NERVE, where it comes out from the cavity of the Pelvis, along with the Pyriform Muscle, is marked (z).

THIRD BOOK.



OF THE JOINTS.





## BOOK THIRD.

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OF THE

## JOINTS.

IF this book seem short, it is because I have omitted many joints, which it is decent and proper for the professed anatomist to be acquainted with, but which it were very superfluous to trouble the student about, for the subject is hardly even curious, and certainly not useful. Therefore I have made a fuller description of the shoulder, knee, and hip; and have refrained from giving any drawings of the joints of the head, of the Vertebræ, or of the ribs: for these joints are not easily understood, are hardly worth remembering, and are very soon forgotten. It was natural for me to be afraid lest the history and drawings of these joints might swell the book, 'making it more expensive, and less useful.

PLATE

N

## P L A T E I.

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*This Plate explains the Text Book, from page 437, to page 439.*  
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EXPLAINS the Shoulder Joint, Elbow, and Wrist.

## FIGURE I.

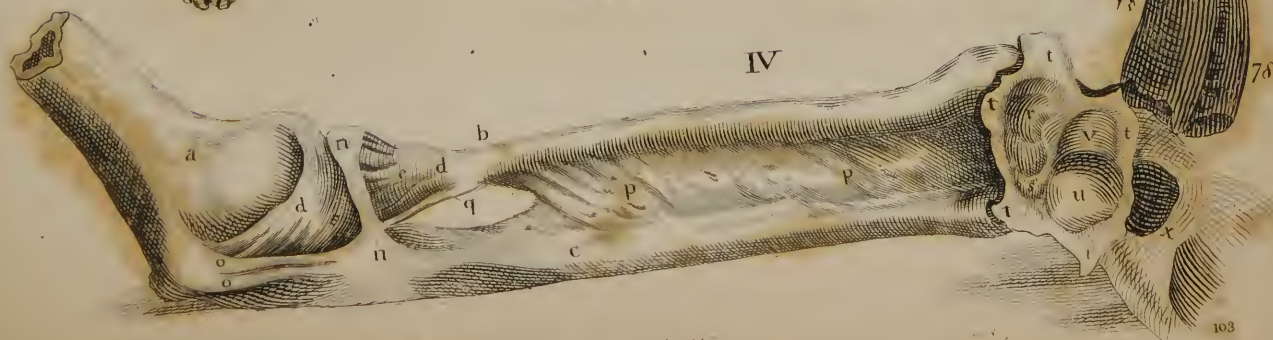
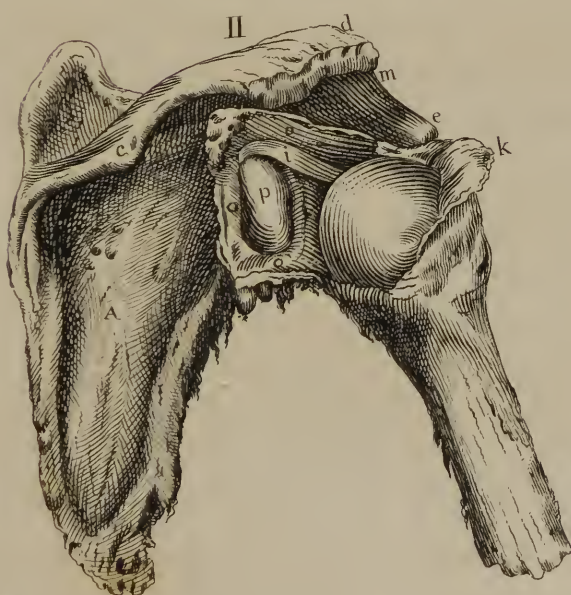
Is the shoulder joint which was set up for this drawing, the whole piece of anatomy resting upon the lower angle of the Scapula, and upon the cut end of the Os Humeri. The marked points by which the muscles and the joint are explained, are these chiefly: (*a*) The Clavicle; the letter (*a*) is placed on the middle of the bone, where it projects in the collar or root of the neck; (*b*) is the end next the Sternum with some ragged flesh hanging from it; (*c*) is the flat end by which it touches the point of the Acromion Process; (*d*) marks the Acromion Process where the Clavicle is joined to it; and (*e*) is the point or apex of the Coracoid Process. (*f*) Marks that line of the Scapula which is called its base, and it, like the Clavicle, has the remains of its ragged muscle hanging down from it. And lastly, (*g*) is the Os Humeri.

The muscles which are seen here are,

The SUBSCAPULARIS (77.) covering the whole of the Lower Surface of the Scapula, and better explained than in the smaller drawings for the muscles of the arm. A small part of the SUPRA-SPINATUS (73.) is also seen.

The









The Biceps (78.) is marked in the bellies with its proper number, and its two heads are also marked; the shorter head (*h*) rising from the Coracoid Process; and the longer head (*i*), coming down from within the cavity of the joint.

The Coraco-Brachialis (72.), is seen hanging down loose and flaccid, from the Coracoid Process, and passing obliquely under the two heads of the Biceps; to be fixed into the arm bone.

The DELTOIDES (71.) is cut away from the Scapula and turned backwards, and it hangs over the arm bone very thick and massy. And this white and shining appearance upon the inner surface of the Deltoides is from the Cellular Substance which lies under it being condensed into somewhat of the form of a fascia. And it is from this fascia, that one of the great Bursæ Mucosæ belonging to this joint rises. The flesh of the Deltoid is seen at (*b*), and the fascia, covering the face of the muscle, is marked with the number (71.) And lastly, the LATISSIMUS DORSI (70.) is seen cut off about six inches from its insertion into the shoulder bone, and left hanging there. (*k k*) Wherever they are found, denote the fat which lies in the interstices of the muscles, and which should not be too curiously picked away in any part of a dissection, unless it be necessary for making some important part very clean and distinct.

The parts more immediately belonging to the joint are these.

1. The Acromion Process (*d*) overhangs the joint from above, and prevents luxations upwards.
2. The Coracoid Process (*e*) stands up on the inside of the arm, to strengthen the joint in that direction also.
3. The LIGAMENTUM PROPRIUM TRIANGULARE SCAPULÆ (*m*) crosses from the Acromion to the Coracoid Process, makes a sort of bridge betwixt them, and keeps all firm in that direction.
4. Another ligament is seen here, the LIGAMENTUM COMMUNE TRAPEZOIDES (*n*), which does not rightly belong to this joint, being but a ligament of the Clavicle;

so that there are the following parts attached to the Coracoid Process (*e*), viz. the Coraco-brachialis (72.), and the short head of the biceps (*h*), going down from it, the Ligamentum Triangulare Proprium (*m*) going to the Acromion, and the Ligamentum Commune (*n*) going to the Clavicle.

The Capsule or bag of the joint which is exceedingly thin, and lax, is marked (*o o*); and it is cut open to show the head of the bone, as it lies in the socket. This shows also the long tendon (*i*), of the Biceps as it comes through the socket, lying upon the round head of the shoulder bone. And lastly, the flat tendon of the Subscapularis is seen spreading over the Capsular Ligament at (*p*), by which it will be easily conceived, how the other muscles spread over the Capsule to strengthen it; for here it is seen, that the cut edge of the Capsule, and the cut edge of the tendon of the Subscapularis is one and the same part; that is, the flat tendon and the Capsule are so incorporated, that the one cannot be cut nor torn without the other. And thus it may be understood, how the chief security and strength of the shoulder joint is from the muscles surrounding its Capsule so closely, and being implanted directly into the head of the bone.

## FIGURE II.

Is intended chiefly for showing the shallowness of the Glenoid Cavity, when compared with the head of the bone, and it also explains very well the way in which the long tendon of the biceps rises from the margin of Glenoid Cavity.

The SCAPULA (A) is naked, but with the remains of ragged flesh hanging about it; where (*c*) marks the Spine of the Scapula rising towards (*d*), which is the point of the Acromion Process; (*e*) marks the apex of the Coracoid Process scarcely seen; (*m*) is the Ligamentum Proprium Triangulare lying rather in shadow; the Capsule is here also marked (*o*); it is cut up and thrown quite back in a square form.



form from the manner in which it is cut; the edges of the cut Capsule are still seen surrounding the shoulder bone, as well as the Glenoid Cavity; and this throwing back of the Capsule shows the shallowness of the Glenoid Cavity (*p*), and the roundness and largeness of the head of the shoulder bone; and within the Capsule is seen the long head (*i*) of the biceps, rising from the margin of the socket, at its upper part. (*k*) Marks the remains of the tendon of the Supra-spinatus Muscle, where it lies upon the Capsule and adheres to it; and it is this tendon which give the Capsule an appearance of thickness, and makes it turn so rigidly backwards at this particular point (*k*).

### FIGURE III.

MAY be compared with figure i. to observe how entirely the joint is surrounded with its great muscles: For here is the Infra-spinatus covering the Capsule, just as the Subscapularis does in figure i. But the chief use of this figure is to give a true notion of one of the greatest Bursæ Mucosæ that belong to the shoulder joint.

The parts marked in this drawing are,

The basis of the Scapula (*a*); the beginning of the Spine of the Scapula (*b*); the Acromion Process (*c*); the Clavicle (*d*); the ligament which ties the outer end of the clavicle firmly to the point of the Acromion Process (*e*); the point or apex of the Coracoid Process (*f*); the shaft of the shoulder bone (*g*). But the head of the shoulder bone is concealed by the muscles, and other soft parts.

Then, of the soft parts there are seen chiefly these, The great belly of the INFRA-SPINATUS Muscle (74.), where it lies upon the Scapula black and shining; (for every muscle when dissected clean, has a metally-like surface); the belly of the TERES MINOR (75.), the tendon of which twists to be implanted thus into the shoulder bone at (*k*).

The short head of the biceps (*h*) is seen rising from the point of the Coracoid Process (*f*);

(*f*); while its longer head (*i*) is seen coming out round and small from the cavity of the joint: The flesh of the CORACO-BRACHIALIS (72.) is seen black, and lying in shadow behind the two heads of the biceps. The two heads of the biceps are not joined to each other till they pass the middle of the arm, *i. e.* below the point where (78.) the number of the biceps is placed.

Lastly, The chief point in this drawing is the Bursa Mucosa marked (*m*); which lies on the outside of the Capsular Ligament of the joint; it is very large, and is surrounded by many smaller ones. This is sufficient to explain the appearance of a Bursa Mucosa; the use of this great one, lying betwixt the Capsule of the joint and the Acromion Process is easily conceived, and the nature of the smaller ones lying under the point of the Coracoid Process, and under each of the tendons, as of the Teres Major, Latissimus Dorsi, &c. need hardly be explained\*.

#### FIGURE IV.

EXPLAINS the Elbow-joint; and also shows the Wrist, but imperfectly.

The three bones which form the Elbow-joint are, the Humerus (*a*); the Radius (*b*); and the Ulna (*c*.) They are all connected with each other by the general Capsule or bag of the joint (*d*), which is derived from the Periosteum, coming off from the shoulder bone above those hollows which receive the Olecranon and Coronoid Processes; which is in itself thin, and delicate, but is crossed by lateral and transverse Ligaments, so that it does not appear like a distinct bag; and therefore the chief demonstration is of the bands, which go across the Capsular Ligament to strengthen it in various directions.

1. The CORONARY LIGAMENT of the Radius is not, as might be supposed, any distinct ligament, but merely a particular form of that part of the General Capsule.

The

\* This is the Bursa which I had seen distended with a prodigious quantity of glairy fluid, and producing a tumor upon the shoulder. *Vid.* Book upon the Joints, page 431.

The Coronary Ligament (*e*) is just that part of the General Capsule, which belongs to the head of the Radius. In attaching itself to the neck of the Radius, it seems a little radiated or pursed up at the root (*d*); a little higher as at (*e*), where it goes over the plain button-like head of the Radius, it is braced very firm; it is indeed hard and cartilaginous, particularly hard and smooth within; and at this point, it is especially strengthened by two Accessory Ligaments; the one (*m*), named the ANTERIOR ACCESSORY LIGAMENT, is hardly to be distinguished from the fore-part of the General Capsule, which is irregular and very lax. This Accessory Ligament is almost mixed with the lower part of the Capsular Ligament; being in fact but a stronger band of the general Capsule, the Capsule being stretched over the point of the Coronoid Process of the Ulna. But there is another strengthening of the Capsule, which forms a more distinct and stronger Accessory Ligament for the Coronary Ligament of the Radius: This Accessory ring of Ligament is marked (*n*), and rises from the sharp edge of the Coronary Process of the Ulna.

And lastly, the two INTERNAL LATERAL LIGAMENTS, or the strengthenings of the Capsule by slips of Ligament, which come from the Condyle, are marked (*oo*). There are generally two as here represented; but sometimes they are united into one larger Ligament. These two small but strong slips of ligament go from the inner Condyle of the Os Humeri to the root of the Coronoid Process, where it rises from the body of the Ulna.

The INTER-OSSEUS LIGAMENT, which passes betwixt the Radius and Ulna, is marked (*p*); its stringy fibres are seen, and also the holes by which arteries and veins pass from the fore to the back parts of the fore arm. One particular slip of ligament marked (*q*), is named CHORDA TRANSVERSALIS CUBITI; and is always found of this form, stretching from the Radius below its Tubercle, to the Coronoid Process of the Ulna.

In the lower part of the same drawing we have the wrist-joint, where (*r*) marks the  
Scaphoid



Scaphoid Cavity of the Radius (*s*). The moveable Cartilage, small and Triangular, which represents the head of the Ulna in this joint (*t*), points out the oval form of this cavity by circumscribing it; (*u*) shows the round head of the Os SCAPHOIDES; (*v*) shows a similar round Articulating Surface of the Os LUNARE; and it is here seen, that these two are the chief bones on the part of the Carpus, and that they form together an oval head, which, corresponding with the oval form of the Scaphoid Cavity of the Radius (*r*), makes the wrist-joint a regular hinge, not capable of lateral motions.

The Capsule of the wrist which incloses these bones, to form them into a joint, is seen here with its cut edges marked (*t*); for the lines from (*t*) serve at once to circumscribe the joint, explaining its oval form, and to mark the cut edges of its Capsule. (*x*) Marks the cross Ligament of the wrist which binds the tendons down into the deep hollow, which is represented here; and (103.) marks the Abductor Pollicis.







## P L A T E II.

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*This Plate explains the Text Book, from page 239, to page 452.*  
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THE two first figures of this plate explain the Hip-joint; of which the chief parts are the socket, the head of the bone, the Capsule, and the Central Ligament of the joint.

THE Os ILIUM is marked (*a*); the crest or spine of the Ilium is marked (*b*); the Posterior Spinous Processes of the Ilium (*c*); the Anterior Spinous Processes are marked (*d*); the Spinous Process of the ISCHIUM, is marked (*e*); and the Tuberosity of the Ischium, the lowest point of the Pelvis, upon which we sit, is marked (*f*); the Ramus or leg of the Ischium, joining the leg of the Pubis, is marked (*g*); the Thyroid hole (*h*); the Symphysis Pubis (*i*); and the crest of the Pubis (*k*); the shaft of the thigh bone is marked (*l*); the great Trochanter is marked (*m*); and the head of the bone is marked (*n*).

The parts of the joint are marked with numbers, thus,

- (1.) Is the bony margin of the Socket where it is formed by the Tuberosity of the Os Ischium; there the socket is very deep.
- (2.) The Cartilage which encircles the brim of the socket, making it still deeper and more secure.
- (3.) A part of the circle of the socket opposite to the Thyroid hole, where the socket

O

is

is exceedingly shallow, or where rather the bony margin of the socket is wanting, and its place is supplied by a Ligamentous substance.

- (4.) Is the Capsular Ligament of the hip, which is the strongest in all the body. The thick cut edges of the Bursal Ligament are seen here; and the ligament is seen to come off at (n), from the Cartilaginous borders of the Acetabulum, being truly (as it is explained in the description of this joint) a continuation of the Perichondrium, or membranous covering of the Cartilage, consisting of two Lamellæ, one of which comes from the Internal Surface of the Socket, while the other comes from the outer surface of the bone, and both of them are condensed into the Bursal Ligament.
- (5.) Is a strengthening of the General Capsule, or what may be called the Accessory Ligament, coming down from that little Bump which is named the INFERIOR ANTERIOR SPINOUS PROCESS of the Os Ilium; and this Accessory Ligament is best seen in figure ii. where the Capsule is preserved entire, chiefly for the purpose of showing this strengthening or supplementary band.
- (6.) Is the CENTRAL LIGAMENT, which is commonly called the round ligament, though it is truly of a Triangular form; rising by a broader basis at (6.) from the center of the socket, and implanted small, neat, and round into that dimple which is seen in the drawings of the thigh bone, in the very center of its globular head; indeed the dimple made by the insertion of this ligament is well seen here at (7.)
- (8.) In the deep part of the socket, where this figure is placed, we see dimples irregularly hollow, which are the beds for lodging the MUCOUS DUCTS of the joint, or what has been called, though not truly, the SYNOVIAL GLAND; and at these hollows there are Frenulæ, or little tongues of the inner membrane of the socket, which hold these Mucous Ducts in their place; there are also little Frenulæ round the neck of the bone, especially at its root, which conduct the Mucous Ducts, which lie there.

These are the Frenulæ, or little ligaments, which I meant to enumerate in page 440.

by

by saying "that there are two Internal Ligaments belonging to this joint, viz. the "great INTERNAL CENTRAL, or round ligament as it is called, and these smaller "MUCOUS Ligaments."

(9.) Is the root of the Bursal Ligament, for it embraces not merely the head, but also the neck of the bone; and it is here explained how the Periosteum (*o*), which is seen torn up from the shaft of the thigh bone, goes off from the bone at (9.) in the form of Bursal Ligament, so that the Bursal Ligament and the Periosteum are continuous, being different modifications of one membrane.

### FIGURES III. AND IV.

ARE drawings of the outside of the knee-joint, for explaining the General Capsule of the joint, and especially for explaining the strengthenings of the Capsule, which are known by the names of Lateral and Posterior Ligaments.

FIGURE III. shows the inner side of the knee-joint, with the great Internal Lateral Ligament. (*a*) Marks the thigh bone; (*b*) the Tibia, and the letter is placed upon that bump, which receives the tendon of all the Extensor Muscles; (*c*) the Patella appearing through the tendinous expansions which cover all the joint.

There is left here a part of the fleshy belly of the Vastus Internus Muscle (174.) This belly expands into the form of a thin tendinous fascia, which goes over the common Capsule of the joint at (*d*), to strengthen it. It is at (*e*), that the broad tendon of the Vastus Internus is inserted into the Patella; and (*f*) is the strong LIGAMENT of the PATELLA, which comes down from the pointed lower end of the Patella, which though it is called Ligament, is merely the thick and tough tendon by which all the muscles, which extend the leg, as the RECTUS, VASTI, and CRURÆUS, are fixed into the knob (*b*), upon the head of the Tibia. (*g*) Marks that margin of the head of the Tibia upon which the Semi-lunar Cartilage plays, and this sharp edge

is



is seen here shining through the Capsule of the joint. (*i*) Marks the Capsule of the joint itself, thin and delicate at this point (by the side of the Patella). (*k*) Marks the great INTERNAL LATERAL LIGAMENT, which is sometimes named LIGAMENTUM LATUM INTERNUM, from its great breadth. It is not merely a strengthening of the common Capsule, as the Lateral Ligaments of the elbow-joint are, but is a firm and distinct ligament, bright and glistening with silvery lights upon it like mother of pearl, of full three inches in length, very regular and formal, of a triangular shape, rising by a broad basis from the inner Condyle of the thigh bone, inserted by a smaller and more pointed end into the head of the Tibia; and stretching down the bone, so as to mix gradually with the Periosteum, and with the General Fasciæ or Tendinous Expansions, which go out over the fore parts of the Tibia. And that it may be understood, how little this Ligament is connected with the Capsule, and how fairly it is entitled to the name of Lateral Ligament, I have dissected it so as to thrust a piece of Bougie (*l*), under the middle of the ligament, where it passes over the middle of the Capsule. Behind this at (*m*), there is a band of ligament lying, and in the direction of the greater ligament, which might almost be named as a lesser Internal Lateral Ligament, but which is described only as a strengthening of the greater one.

FIGURE IV. at the same time that it explains the Posterior Ligaments, represents also the Lateral Ligaments on the outer side of the joint. (*a*) Marks the thigh bone; (*b*) the Tibia; (*n*) the Fibula; (*i*) the Bursal Ligament of the joint, so cut as to expose the inner Condyle of the thigh bone, naked and shining.

This Bursal Ligament is strengthened every where behind, by irregular strings of ligament passing over it in all directions, but chiefly oblique, and one of these oblique Fasciculi or bands is generally so very strong, as to deserve the name of Ligamentum Posticum. So I have marked the irregular Fasciculi (*o*), and I have marked the more formal Ligament the Ligamentum Posticum Winslowii (*p*).

The

The great LATERAL LIGAMENT on the outer side of the knee-joint is marked (*q*). It is here seen, that the EXTERNAL LATERAL LIGAMENT is not so flat as the Internal one, that it does not lie so fairly as the Internal one upon the side of the joint, but that it inclines a little towards the back part; and it is seen in the drawing as I have explained it in the book, that the proper External Ligament, the LIGAMENTUM LATERALE EXTERNUM LONGUM (*q*), is a large and strong ligament, proceeding from the outer Condyle of the thigh bone, and fixed into the head of the Fibula; but that the LIGAMENTUM EXTERNUM LATERALE BREVIUS vel MINUS (*r*), has not the true form of a Lateral Ligament coming down from the Condyle, but is a mere strengthening or outward band of the Capsule, rising upwards from the knob of the Fibula.

So that in these two drawings, iii. and iv. are seen, all the chief parts on the outside of the knee-joint.

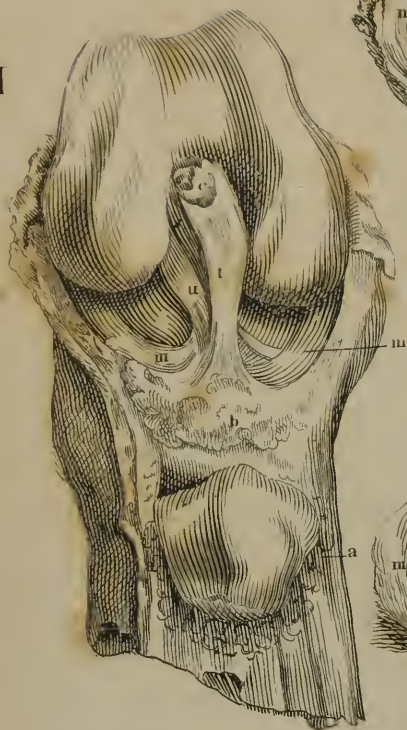
1. The bones as, (*a*) the thigh bone; (*b*) the Tibia; (*c*) the Rotula or Patella; (*n*) the Fibula; and (*f*) the strong Ligament of the Patella, a part which is properly arranged with the bones.
2. There is the Capsule and parts connected with it, as (*i*) the thin membrane of the Capsule itself; (*d*) the Fascia or expanding tendon of the Vastus Internus spreading over it, to strengthen it.
3. The Lateral and Posterior Ligaments, as (*k*) the INTERNAL LATERAL LIGAMENT, flat, strong, and almost triangular; with a small ligament (*m*) to strengthen it; (*q*) the great EXTERNAL LATERAL LIGAMENT rounder and more oblique; which (in its turn also) is strengthened by a smaller ligament (*r*). And lastly, the strengthenings on the back part of the joint, which are irregular at (*o*), and which form sometimes a more regular Ligament at (*p*), the LIGAMENTUM POSTICUM WINSLOWII.

This Anatomy of the knee-joint is continued in the two first figures of next plate.

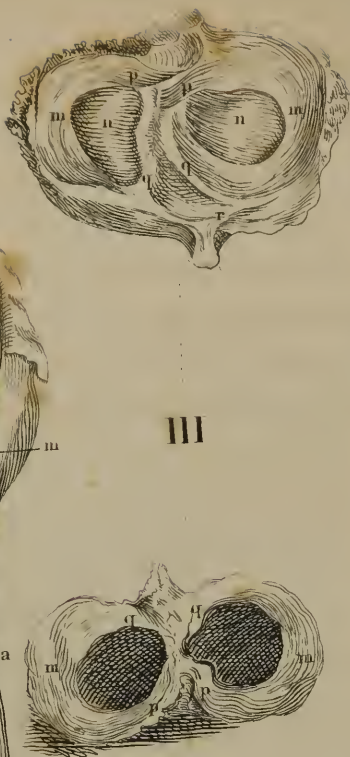
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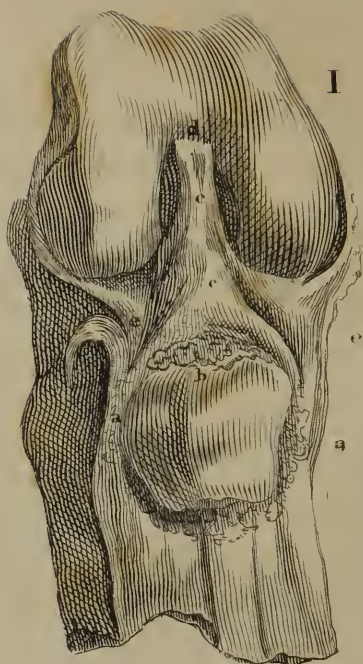
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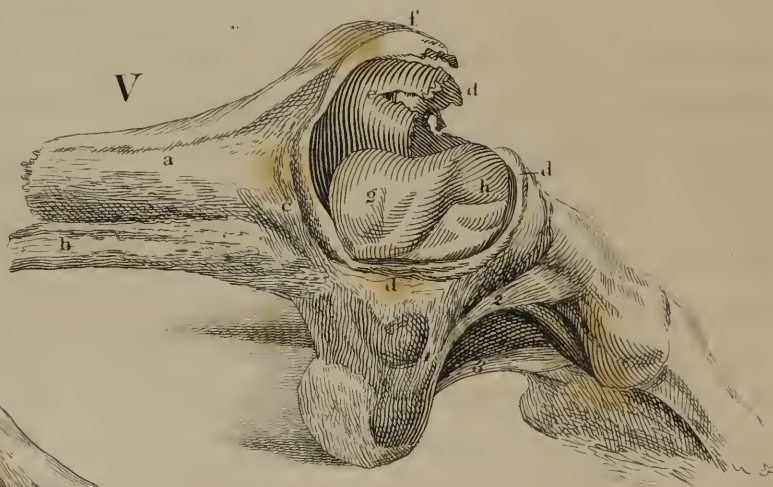
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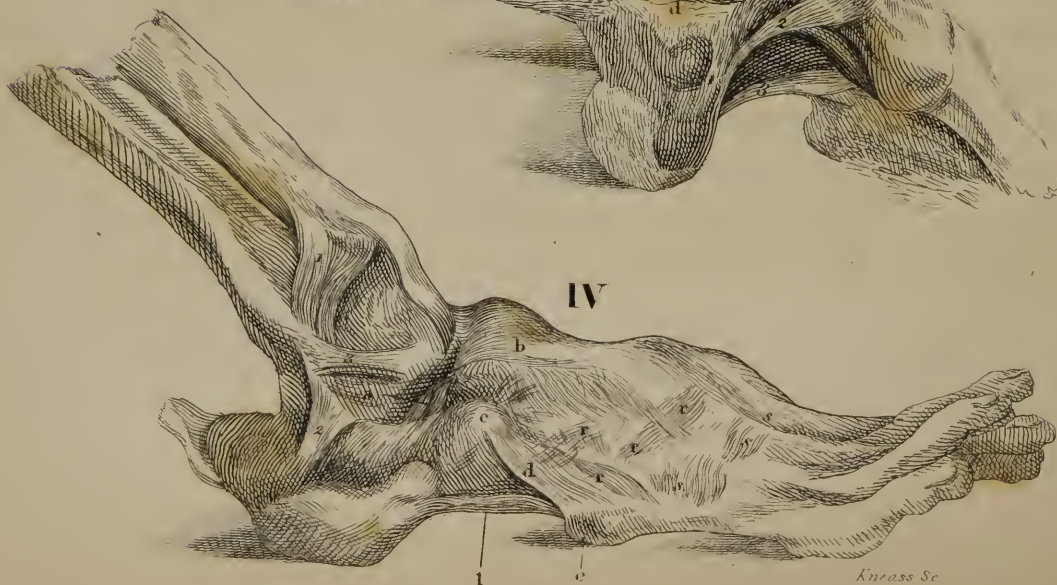
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## P L A T E   I I I .

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*This Plate explains the Text Book, from Page 443, to Page 452.*  
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THE Anatomy of the knee-joint is continued in this plate. It explains the internal parts, the knowledge of which is more valuable than of the external parts, in proportion as internal diseases of this joint are more frequent than luxations, which never happen except in those terrible injuries, where all the soft parts belonging to the joint, are entirely torn up by the roots, so that the limb cannot be saved. The chief parts to be observed within the joint are the fat, and Mucous Membranes, which lubricate the joint, the Ligaments or Frenulæ, which order and regulate the motions of these fatty masses and fringes, the Semi-lunar Cartilages which, like friction-wheels facilitate the motions of the joint; and lastly, the great Crucial Ligaments by which the joint is strengthened within, the Crucial Ligaments alone being stronger than the whole of those Ligaments which are to be seen on the outside of the joint.

## 1. THE FAT.

THE fat which is for lubricating the knee-joint, though it is not entirely confined to the circle of the Patella, yet it chiefly surrounds it; and with the fat there are  
many

many fringes of the Mucous Ducts; much fat is found at each side of the Patella at (*a a*), but the chief collection is at the lower part of the Patella. At (*b*) figure i. this fat appears peeping out from under that ligament, by which its motions are regulated; but at (*b*) in figure ii. the ligament is cut away, and all the fat is freely seen.

This collection of fat and Mucous Ducts makes a rising upon each side of the Patella, marked with a deep and smooth sulcus round the edge of the bone; and this hanging of the fat on each side of the Patella, is named by WEIDBRIGHT the Ligamentum Alare Majus, where it hangs in the inner side of the Rotula; and Ligamentum Alare Minus, where it projects less at the outside of the Rotula; (*Vid. (a a)* figure i.) But all this is quite arbitrary; these are not ligaments, nor do they tie any other part; they are but looser foldings of the inner coat of the Capsule, where it rises over the inner surface of the Patella, and where it holds larger globes of fat, or conducts the fringes of the Mucous Follicules.

## 2. The MUCOUS LIGAMENT.

These bundles of fat are tied by a true ligament (*c*), which properly belongs to them. But to understand this ligament and its names, it must be observed, that the two Lunar Cartilages are moveable; that the two horns of the Lunar Cartilages are tacked together by a little Transverse Ligament; and that this Transverse Ligament is again connected with the little mass of fat, which lies under the lower border of the Patella; and lastly, it is to be remembered, that these fatty bundles are chiefly intended for conducting and defending the Mucous Ducts or fringes. Now the ligament (*c*) figure i. which regulates at once the positions of all these parts in the various motions of the joints, has been named "Ligamentum Mucosum," by Vesalius, he referring it to the Mucous Membrane; it is named "the Ligament moving the Semi-lunar Cartilages" by Chesselden; it is named, "Ligamentum Internum  
" Longitudinale,"

“Longitudinale” by Walther, because of its running down exactly in the middle of the joint; it is named not unfrequently “Ligamentum Gracile,” from its delicacy. Weidbright seems to call it (in one place at least) “Frenulum Pinguedinis Glandulosæ;” and he concludes with a question, whether this in place of being a distinct Ligament be not rather a continuation of his two Aliform Ligaments.

But the nature of this ligament is very distinct. It is a regular ligament of a very constant form, and having very curious uses; it is a ligament tolerably thick, but of a soft and membranous nature. It is small and pointed above as at (*d*), where it rises from the interstice betwixt the two condyles of the thigh bone; it gradually broadens downwards, so as to acquire rather a triangular form, terminating by a broad base near the root of the patella at (*ee*). It lies in the fore part, or rather perhaps in the centre of the joint in the middle behind the patella, and before the Crucial Ligaments. Its basis spreads out into two limbs (*ee*); one going to the right side, and the other to the left, and this forking of it is named by Walther **LIGAMENTUM TRANSVERSUM SEMICIRCULARE\***; calling the upper and smaller part of this ligament the Longitudinal Ligament; while he names the basis and broader part of the ligament the Transverse Ligament, and it is under this root or transverse part of the mucous ligament that the fat which it confines is seen peeping out at (*b*).

This ligament then, (which in place of dividing thus curiously into Longitudinal and Transverse or Alar ligaments, may be described under the general title of Mucous Ligament), is of considerable size, being almost of the thickness of the little finger, and is the part that is seen when the joint is first opened; not firm and hard like those ligaments which tie the bones, but soft, delicate, and membranous, fit for its office of conducting the mucous ducts in safety, and regulating the motions of the fatty bundles. It is small at (*d*), where it comes off from the great Sulcus betwixt the condyles.

\* So Walther names as Transverse Ligament those parts which Weidbright marks by the names of Ligamentum Alare Majus and Minus.



dyles. It grows broad at its root, being there so large as to fill up all the empty space in the joint. It assumes at its lower part a triangular or prismatic form, with one flat side directly forwards, and the other angle of the prism looking backwards in the joint, and covering the crucial ligaments which lie in the back part of the cavity. After enlarging at its basis, it degenerates into a soft mucous or membranous covering for the fat and mucous glands; thus it is connected at its root with the lower edge of the patella; with the fat and mucous fringes, and with the fore horns of the Semilunar Cartilages. So that this ligament moves in every motion of the joint, as the thigh-bone from which it rises moves, it is moved the more from its connection with the patella, and as this ligament moves along with the patella, it in its turn moves the Semilunar Cartilages and the bundles of fat, and keeps them fixed, or draws them forwards; for were the fat permitted to move backwards, it would be bruised directly betwixt the bones with a force that would destroy it; and thus the mucous ducts not only by the elasticity of the fat which surrounds them, start out from betwixt the bones when they press too closely; but the fat together with all the glands which belong to it is so held forward by this mucous ligament as to lie always in the free and open part of the joint.

This ligament was thought by the ancients to be sometimes wanting, though this cannot be true of a part so essential to the sound constitution and free motions of the joint. It is believed by some, that it may be torn in sudden and violent bendings of the knee; it surely is the part the most subject to disease, since we find it in ulcerated joints quite corroded. It is plain that this part must be most peculiarly subject to inflame, since it is continually working in every motion of the joint; it is not only delicate in itself, but is connected with all the more delicate parts; for the inner membrane of the capsule is continuous with this Mucous Ligament; the fat that surrounds the patella is continuous with it; it conducts the fringes or ducts of the chief mucous glands; it is itself a secreting surface, and the moveable or Semilunar Cartilages

lages are tied to it; by all which circumstances it becomes too important in the economy and diseases of this delicate joint to be passed slightly over.

### 3. THE MOVEABLE CARTILAGES.

The two MOVEABLE CARTILAGES are not seen in Fig. i. because the mucous ligament which covers them is entire. In Fig. ii. they are marked (*mm*.) The letters (*mm*) touch the outer edges of the cartilages, where their outer margins adhere to the inner surface of the capsule.

The parts and connexions of these cartilages are better explained in Fig. iii. where (*mm*) still mark the outer circles which adhere to the inner surface of the capsule. The letters (*nn*) mark the thinner edges, and show the space in the center of each cartilage which holds the condyle of the thigh-bone. (*pp*) Mark the two posterior horns and the little tags of ligament by which they are tied to the crucial ligaments behind. And (*qq*) mark the two anterior horns, and the little tags of ligament by which they are tied to the root of the mucous ligament before. And (*r*) marks a little cross ligament by which the two anterior horns are connected with each other, and which is named **LIGAMENTUM TRANSVERSALE COMMUNE.**

### 4. THE CRUCIAL LIGAMENTS

Are well seen in Fig. ii. where (*c*) marks the part from which the pointed origin of the mucous ligament was cut away. And by cutting away that ligament, the Crucial Ligaments which, in Fig. i. are covered by the mucous or central ligaments, are in this drawing brought into view.

The Crucial Ligaments lie both in the back part of the joint, and touch that part of the Capsule, which lies in the Ham; but one of them (*s*) lies behind, whence it is called the Posterior Ligament, and the other (*t*) though it lies flat upon the Posterior Ligament,

Ligament, and in contact with it; yet being before it, is named the Anterior Ligament.

The reason of this Anterior Ligament being represented as coming so far forwards as to touch in a manner the root of the Patella, is plainly this; that to take a sure hold of the Tibia it does actually rise over the tubercle in the center of the joint, and goes out flat over all the face of the joint, and the reason of the Posterior Ligament seeming to follow this one, and to come also far forwards in the joint, is, that the ligaments of the horns of the Lunar Cartilages climb upon the fore-part of the Posterior Ligament, and so it is more properly the Ligament of the Lunar Cartilage that is seen at (*u*), while the head only of the Posterior Crucial Ligament is seen at (*s*). But both the true direction and extent of these ligaments and their true office will be better understood by the following plan; for there is this one thing very singular in the effect of these ligaments, that it is not the Posterior Ligament that checks the leg and prevents it going too far forwards; nor the Anterior Ligament that prevents it being strained backwards, but quite the reverse; for the Posterior Ligament is most stretched when the knee is bended; the Anterior Ligament again is stretched when the leg is extended.

FIGURE I. Shows the leg extended.

FIGURE II. Shows the knee bent.

In Figure 1st, (*a*) is the Thigh-bone; (*b*) the inner Condyle; (*c*) the Outer Condyle; (*d*) the head of the Tibia; (*e*) the knob in the center of the Knee-joint; and (1) is the Anterior Ligament arising from the Outer Condyle, (viz. the one nearest the eye in this drawing), and going out over the fore-part of the Tibia, and inserted properly into that hollow (*f*), which receives the Condyle; (2.) is the Posterior Ligament, rising rather from the center of the Thigh-bone betwixt the Condyles, and going down over the back-part of the Tibia at (*g*).

And



And in figure ii. it is plain by the change of the position of the bones, that when the knee is bent, the Posterior Ligament (2.) is stretched, and the Anterior (1.) relaxed. And of course, as in figure i. that when the leg is extended, the Anterior Ligament (1.) will be stretched, and the Posterior (2.) relaxed.

In

PLAN FOR THE CROSS-LIGAMENTS OF THE KNEE JOINT.



In these three drawings, all the internal parts of the knee-joint are explained.

1. The **FAT** which is collected chiefly round the **Patella**, which perhaps does not exude nor mix with the fluid of the joint, but serves rather by its **Lubricity** and **Elastic** nature, to conduct and defend the fringes or **Mucous Ducts**.
2. The **MUCOUS LIGAMENT**, which is the first part that is seen upon opening the joint; which lies in the center of the joint; is of a soft and mucous nature; conducts many of the **Mucous Fringes**; and which, descending from the middle of the thigh bone betwixt the **Condyles**, is attached to the lower edge of the **Patella**, and to the **Semi-lunar Ligaments**, and so it moves along with the **Patella**, and moves in its turn the **Cartilages** and the fat. It regulates the motions of the **Cartilages**, and it draws forwards the fat, preventing it going backwards, so as to be bruised betwixt the bones.
3. The **SEMI-LUNAR CARTILAGES**, which are like the labels which are put round the neck of a wine flask. They are tied at the horns by ligaments, as the label is hung by its chain; lie flat upon the **Tibia**, to facilitate its motions, and enable, at the same time, the **Condyles** of the thigh bone to change their centers of motion, according to the various postures of the joint.
4. The **CROSS LIGAMENTS**, which are very thick, and strong, lie chiefly in the back part of the joint, and by their going the one over the face of the **Tibia**, and the other down along the back of the bone, they limit both its motions, the one checking it in too violent bendings of the knee, the other limiting its extensions. So that the motions forwards and backwards are limited by these **Cross Ligaments** within the joint, while it is secured from irregular **Lateral** motions by the strong **Lateral Ligaments** without.

FIGURES

## FIGURES IV. AND V.

EXPLAIN the Ligaments of the ancle joint, and of the foot. All the great Ligaments belonging to the ancle joint, or to the Tarsal Bones, are drawn in figure iv. and in figure v. are seen the two great ligaments lying in the sole of the foot.

## FIGURE IV.

THE Ligaments belonging to the ancle joint are these,

- (1.) A strong Ligament tying the Fibula to the Tibia. It is large and very strong; commonly it is divided, as here, into two, sometimes into three slips; sometimes they all adhere. It is named the *LIGAMENTUM ANTICUM SUPERIUS*. There is on the back part of the Fibula a ligamentous membrane, which is like this one, and is named *Ligamentum Fibulæ Posticum Superius*.

These ligaments connect the Tibia and Fibula so firmly to each other, that they are as one bone with two processes, viz. the inner and outer ancles.

- (2.) Is the *MIDDLE PERPENDICULAR LIGAMENT*, a very strong ligament, which descends directly from the point of the outer ancle, to tie it firmly to the side of the *Os Calcis*. There are three ligaments tying the outer ancle to the foot; viz. first, this middle one; second, the anterior one; and, third, one behind the joint, a posterior ligament, which is not seen. This *Middle Perpendicular Ligament*, so named from its position, descends directly from the very point of the outer ancle, and it is implanted into the side of the heel bone. It holds the ancle from yielding to one side, and from bending too much; assisting rather the posterior ligament than the anterior one. It lies close upon the Capsule, and strengthens it; while the tendons of the *Peronæi Muscles* glide and rub across it.

(3.) The



(3.) The ANTERIOR LIGAMENT of the outer ankle is for tying the outer ankle to the Astragalus, as the perpendicular one ties it to the heel bone. It goes sometimes in two distinct bands, as represented here. Very often they are scarcely divided; it appearing as one strong uniform ligament, white and glistening, passing obliquely forwards from the lowest point of the Fibula to the neck of the Astragalus.

These three are the chief ligaments of the ankle; and the order of ligaments which come next, is of those which tie the Astragalus to the Os Calcis and to the Os Naviculare.

1st, (a) Is a ligament, or rather two or three ligaments, which cross the great hole, which, in the drawings of the bones of the Tarsus, is marked with a pencil thrust up through it. This is called the CAVITAS SINUOSA; and so these irregular ligaments are named Ligamenta, or APARATUS LIGAMENTOSUS CAVITATIS SINUSÆ. They are merely irregular ligaments, lying deep in this hollow, and tying the Astragalus to the Os Calcis.

2d, (b) Is a ligament which ties the Astragalus to the Os Naviculare. It begins at the neck of the Astragalus; touches the Os Naviculare; goes still forwards, and spreads a little upon the cuneiform bones; and, from this expanding form, is named LIGAMENTUM LATUM. Though there are several bands of ligament on the inner side, they are not so particular, nor so formal in their shapes or uses, as to have any appropriated name.

3d, (c) There are ligaments tying the Os Calcis, in its turn, to the Os Naviculare and to the Os Cuboides. The letter (c) is placed upon that prominent point of the Os Calcis whence those ligaments go off; and they go somewhat in a star-like form, just as I have drawn them, and not very distinct. And those bands which go upwards tie the Os Calcis to the Os Naviculare; those which go downwards tie it to the Os Cuboides; for the chief articulation of the heel-bone is with the Os Cuboides.

4th, (d) There goes a little slip of ligament, not much noticed from this same point of  
the

the heel bone, to that part (*e*) of the metatarsal bone of the little toe, which is very sharp and prominent; and is in all positions and drawings the most remarkable point in the foot.

The ligaments again, which tie the several bones of the Tarsus, as the cuboid and cuneiform bones, together, are flat, shining, star-like, and very numerous; and, from their lying upon the back of the foot, are named **LIGAMENTA PLANA DORSALIA**. They are marked (*rrr*); and are too irregular in their form, and too general in their uses, to need any more accurate indication; for these are the ligaments which are so crossed and interwoven, "that they form what we may call a web of ligaments, "consisting of shining and star-like bundles," of a cartilaginous hardness, adhering closely to the whole surface, and passing from bone to bone over all the surface of the foot. (*t*) Is the Ligamentum Longum, which is marked (3.) in the 5th drawing, and is explained in the letter press of that figure.

The ligaments which tie together the Tarsus and Metatarsus are also seen here, at the roots of the metatarsal bones. There are lateral ligaments which tie each metatarsal bone to the one next it. But the ligaments which appear chiefly upon this upper surface, are a continuation of the irregular web of ligament belonging to the Tarsal bones; and as this web takes particular shapes in passing along to the several heads of the Metatarsal bones, these are best named, in general terms, **LIGAMENTA DORSALIA**, the Dorsal Ligaments of the Metatarsal bones; and they are marked (*sss*).

#### IN FIGURE V.

THE Ankle joint is seen opened. The Tibia and Fibula (*a* and *b*) are turned backwards. Their strong ligament (*c*), which binds them together, is seen; the Capsule, which is clean dissected, is marked (*d*), which shows its cut edges. (*e*) Shows

that

that it is a reflection of the Capsule that lines the cavity of the joint; and the process (*f*) of the inner ancle being turned back, the great head, or the cartilaginous pulley of the Astragalus (*g*), is exposed covered with its smooth cartilage. The flat side of the Astragalus within the joint is also seen at (*h*), where it was embraced by the inner ancle or process of the Tibia (*f*). There is but one ligament to be noticed in this drawing; for

1st, Is a band very strong indeed, which passes from the Astragalus to the Os Calcis. It has, as is seen here, the distinct form of a ligament. It ties the Astragalus and Os Calcis strongly together; and so it has also the office as well as the mere form of a ligament. But it happens, that the tendon of the Flexor Pollicis runs through this ring; therefore its office as a ligament (which it truly is) is very little noticed.

2d, There is a ligament of the inner ancle, like the perpendicular ligament of the outer ancle. It is of a triangular form; and is hence named Ligamentum Deltoides. A process of this ligament binds down the Tendons of the Tibialis Posticus, and of the common flexor of the toes. Therefore the ligament marked (2), at the same time that it binds the bones of the foot together, holds down the flexor tendons.

3d, The figure (3) marks the great ligament of the sole of the foot. It proceeds smaller from the point of the heel bone; it enlarges towards its insertion into the Os CUBOIDES. It binds these two bones particularly; and, by binding them, it supports very powerfully the whole arch of the foot; and this ligament, which is also very thick and strong, is of such particular length, (the longest ligament of all the Tarsus), that it is called LIGAMENTUM CALCIS LONGIUS. It is seen under the edge of the foot in the drawing, figure iv. marked (*t*).

But the truest support of any joint is not its ligaments so much as the muscles which bend it; and it is thus with all the flexor muscles which pass under this great arch of the foot—How could the arch of the foot be sustained, by ligaments of any kind,

under



under the whole weight of the body, and its exertions? Surely it could not be sustained otherwise than by the strong action of the Tibialis Posticus and the flexor muscles of the toes; and when a man stands under a burden, as well as when he walks, this arch is sustained by the continual action of those muscles the tendons of which pass under the arch.

FINIS.







